Next Generation Frame (NGF) Fiber Combination Block (FCB) User Manual

Fiber Combination Block

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INTRODUCTION

This manual describes the Next Generation Frame (NGF) Fiber Combination Block (FCB), and provides instructions for installing this product. The FCB may be installed either on an NGF Slim Rack or on a Fiber Main Distribution Frame (FMDF). It may have been ordered empty or loaded with pre-terminated pigtails. This guide addresses all installation options, either by providing instructions or by referring to related publications sent with kits.

Revision History

ISSUE	DATE	REASON FOR CHANGE
Issue 1	06/2001	Original.
Issue 2	07/2001	Technical update to provide more thorough instructions.
Issue 3	05/2005	Figure 6 corrected to show correct breakout point. Cover photo changed. Customer info updated.

Trademark Information

ADC is a registered trademark of ADC Telecommunications, Inc.

Related Publications

Title	ADCP Number
Next Generation Frame (NGF) Slim Rack Installation Manual	90-272
Fiber Main Distribution Frame (FMDF) Installation Manual	93-273
FMDF Patch Cord Cross-Connect and Interconnect Procedures	90-240

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1 PRODUCT DESCRIPTION

1.1 General Description

The Fiber Combination Block (FCB) is a Next Generation Frame (NGF) equipment panel that provides a combination of splicing and termination functions. The FCB may be mounted on either a Fiber Main Distribution Frame (FMDF) or NGF Slim Rack. FCBs are available with different adapter types in block configurations of 48, 72, 96, or 144 (LX.5 only) positions. FCBs also have a left or right orientation for mounting on the left or right side of the rack.

Figure 1 provides a functional overview of the FCB. Outside Plant (OSP) or Intrafacility (IFC) cables are brought in from above or below the FCB (called upward and downward exit, respectively). The cables are spliced to pigtails in the round splice trays in the bottom area of the FCB. The pigtails transition to the Fiber Termination Block (FTB), where they are terminated to adapter/connectors. Patch cords, routed through the NGF rack "Z" trough, are used to complete optic circuits or for patching and testing.

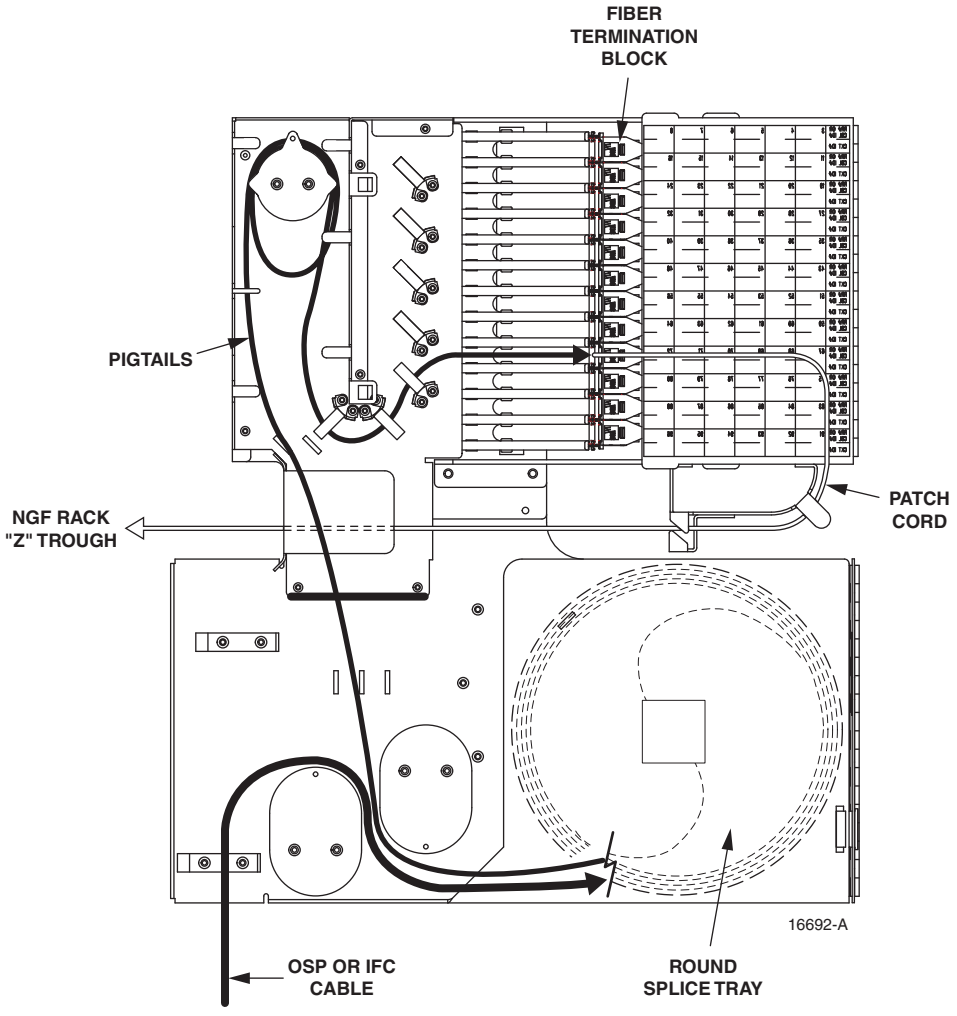

Figure 1. Functional Overview of an FCB (Cable Downward Exit Shown)

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1.2 Main Components and Features

Figure 2 shows the main components and features of a Fiber Combination Block (in this case, the 72-position, left-oriented model). The FCB consists of an upper component called the Fiber Termination Block (FTB) and a lower component called the splice chassis. The FTB by itself is identical to FTBs sold (without splice chassis) as stand-alone units.

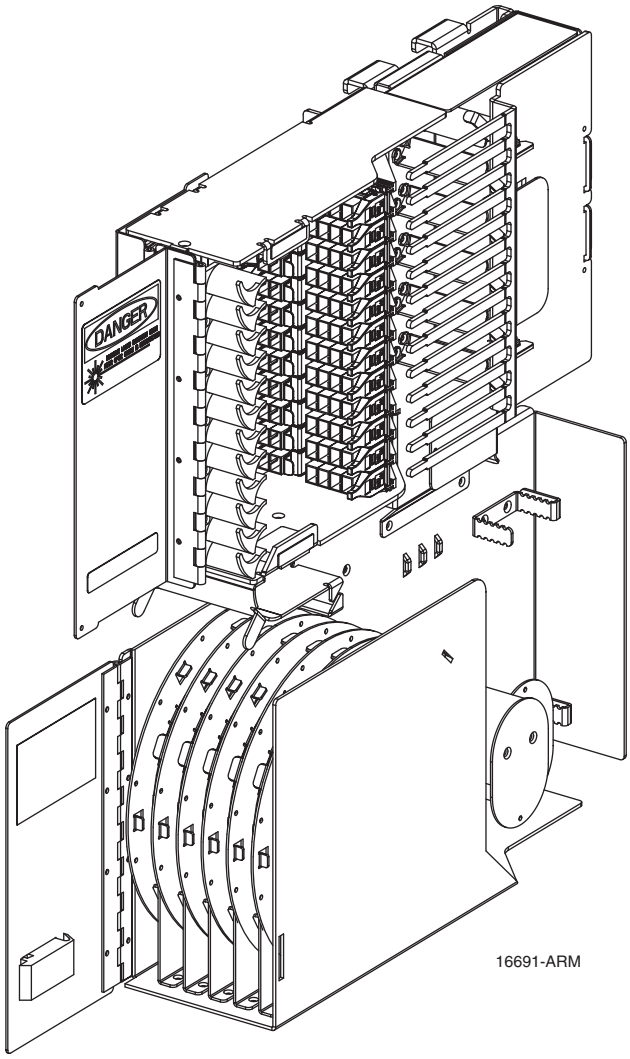

Figure 2. FCB Features (72-Position Left-Oriented Model)

The splice chassis door provides entrance to the splice chassis. Round splice trays within the splice chassis hold splice chips and service coils for splices. Splice trays in the left-oriented version are numbered from left to right (when viewed from the front), with the number 1 tray adjacent to the splice chassis door, as shown.

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The FCB is also available in a right-oriented model. Splice trays in the right-oriented model are also numbered from left to right. This places the splice trays in a reverse sequence with respect to the module features, with the number 6 splice tray adjacent to the splice chassis door, as shown in Figure 3.

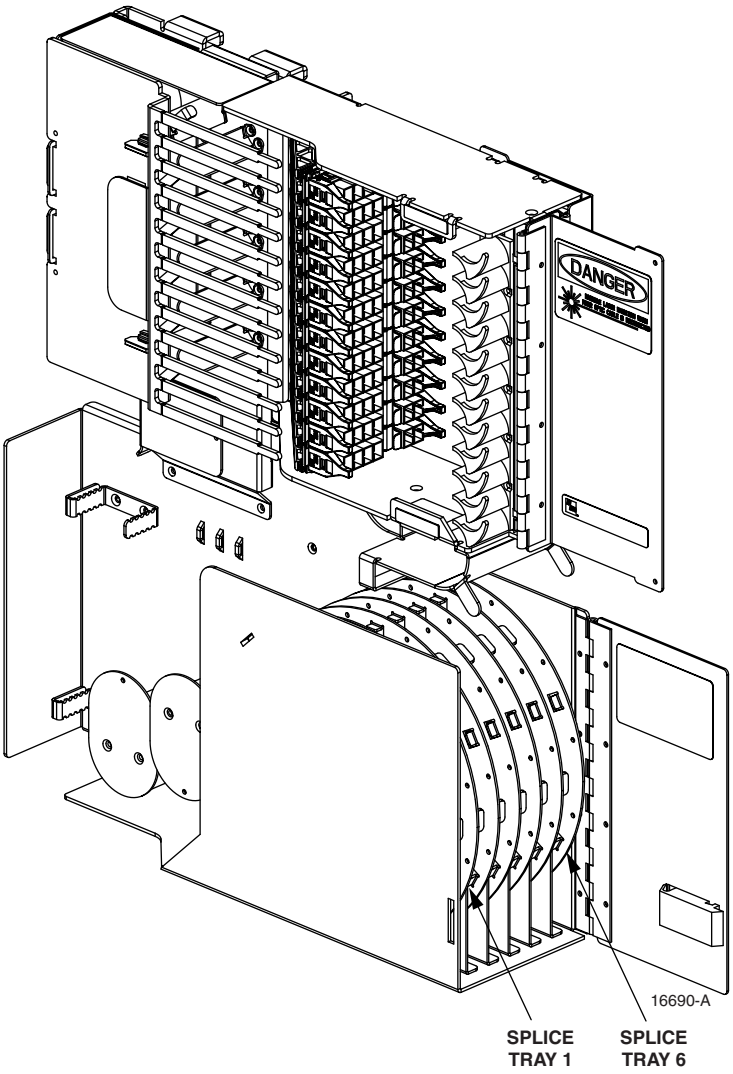

Figure 3. Right-Oriented CFB (72-Position Model Shown)

Radius-limiting spools guide pigtails from splice trays to their point of termination in the FTB. Strain reliefs and cable tie-down locations are used to secure the OSP or IFC cable being routed to the round splice trays. The FCB is shipped with a cable clamp kit that is installed on the rack adjacent to the FCB. The kit includes ground fittings for OSP cable.

The upper component, the FTB, has a front and side cover. The side cover provides access to the area where pigtails are routed into the termination block. The FTB uses sliding adapter packs to provide termination locations for patch cords.

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Front edge protectors in the FTB are used to guide patch cords to the NGF rack “Z” trough, through which they are routed to other FTBs or to fiber optic equipment. Either an interconnect or cross-connect configuration may be used.

1.3 Round Splice Tray

The round splice tray is the component mounted in the splice chassis to provide a protected surface and service loop storage for splicing. Figure 4 shows its main features.

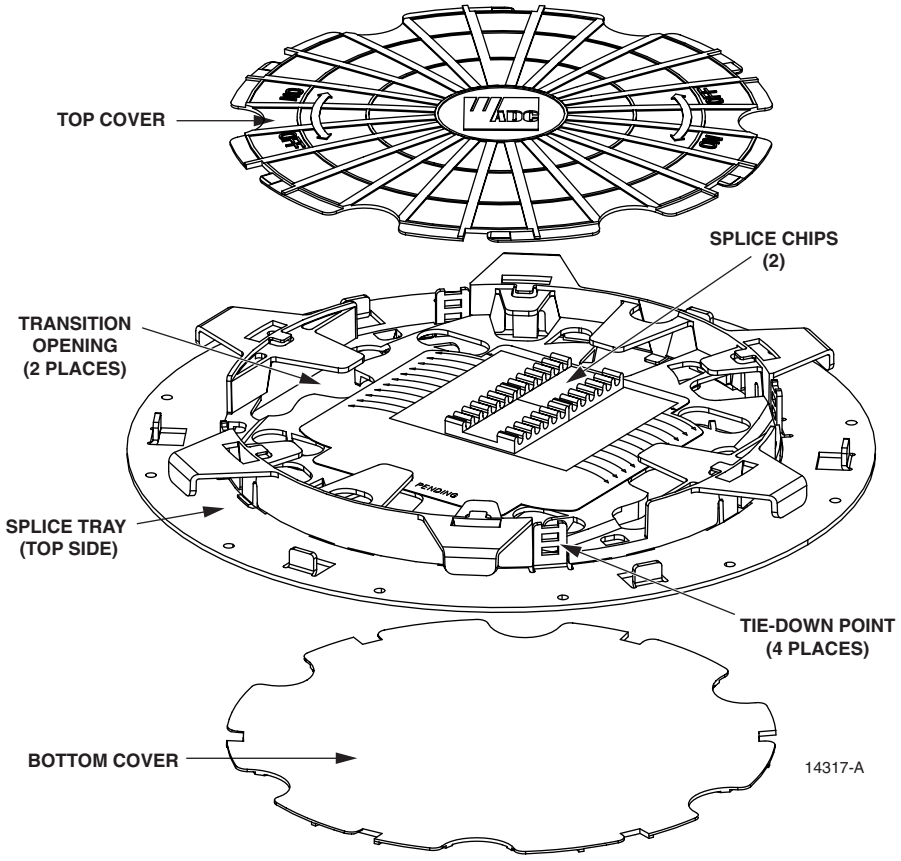

Figure 4. Round Splice Tray

As shown, the tray has a removable top cover, a removable bottom cover, and a splice tray. Cable subunits and pigtails are wound in the same direction around the splice tray and secured at the four tie-down points. Transition openings in two locations are used to route pigtails from the top to bottom of the splice tray, or vice versa.

The direction of wind is clockwise for trays mounted in a left-oriented FCB; the direction of wind is counter-clockwise for the right-oriented FCB. The fibers being spliced are routed through the transition openings on either side of the tray and spliced on the splice chips. Each tray accommodates up to 12 splices (stranded or ribbon) using a standard splice configuration or up to 24 splices (LX.5 only) using a 24-fiber heat shrink configuration.

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2 SPECIFICATIONS

Table 1 lists specifications for the Fiber Combination Block and round splice tray.

Table 1. Fiber Combination Block and Round Splice Tray Specifications

ITEM	DESCRIPTION
Fiber Combination Block	
Dimensions (H × W × D)	21.5 in. (54.6 cm) × 18.6 in. (47.2 cm) × 6.5 in. (16.5 cm)
Weight	36.67 lbs (16.68 kg)
Capacity	Available with 48, 72, 96 termination positions; or with 144 termination positions using LX.5 connectors
Round Splice Tray	12 splices per tray; or 24 splices per tray using LX.5 connectors

3 UNPACKING THE PRODUCT

Unpack and inspect the Fiber Combination Block as follows:

1. Inspect the exterior of the shipping container for evidence of rough handling that may have damaged the contents of the container.
2. Unpack the FCB and check for possible damage.
3. If damage is detected or if parts are missing, file a claim with the commercial carrier and then notify ADC Customer Service. Save damaged carton for inspection by the carrier.
4. Refer to Section 11 for repair, replacement, and warranty information.
5. Save the shipping container for use if equipment requires shipment at a future date.

4 INSTALLATION OVERVIEW

Installation of the Fiber Combination Block involves the following main tasks:

1. **Installing Pigtails—**If your FCB was shipped without pre-loaded pigtails, this will be your first task. This involves stripping back the yellow outer wall of the pigtail bundle (in conformance with the breakout diagram provided) and terminating the connector end of the pigtails at the Fiber Termination Block. For details, refer to Section 5, below.
2. **Mounting the FCB on the Rack—**This consists of aligning the FCB correctly and securing it with the screws provided. For details, refer to Section 6.
3. **Installing Outside Plant—**This consists of three procedures: breaking out the cable (subsection 7.1); installing a blocking kit (subsection 7.2); installing a cable clamp (subsection 7.3).
4. **Loading Round Splice Trays—**This involves removing the round splice trays one by one to a work surface, measuring and breaking out the IFC or OSP cable subunits and pigtails, and routing them into the round splice tray. Details are provided in Section 8.

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5. **Splicing to Pigtails—**This procedure is also done using a work area adjacent to the rack. Guidelines are provided in Section 9.
6. **Installing Patch Cords—**Patch cords may be used in either a cross-connect or interconnect configuration. Guidelines are provided in Section 10.

5 INSTALLING PIGTAILS

If the FCB was shipped empty, so pigtails need to be installed, refer to the following instructions to install the pigtails before mounting the FCB on the rack. If pigtails are already present, skip to Section 6 to install the FCB on the rack. Install the pigtails as follows:

⚠ **Warning:** *Infrared radiation is invisible and can seriously damage the retina of the eye. Do not look into the optical adapter of an operational transmitter or into the launching (output) end of an active fiber. A clean, protective cap MUST be immediately placed over any radiating optical receptacle or optical fiber connector to avoid exposure to potentially dangerous amounts of radiation. This practice also helps prevent contamination of connectors.*

1. Place the FCB on a flat work area immediately in front of the rack.
2. Lay the pigtail bundle on the work surface and strip back the outer wall of the pigtail bundle corresponding to breakout dimensions provided in Figure 5.

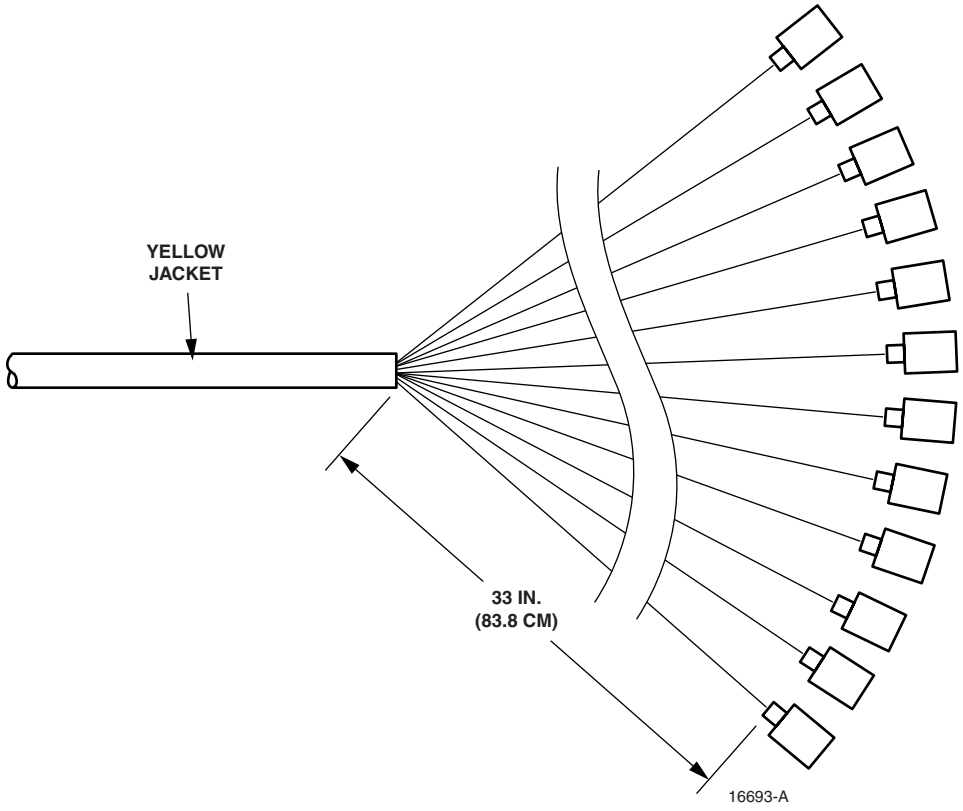

Figure 5. Pigtail Breakout Dimensions

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3. Secure the pigtail bundle to the FCB at the breakout point shown in Figure 6.

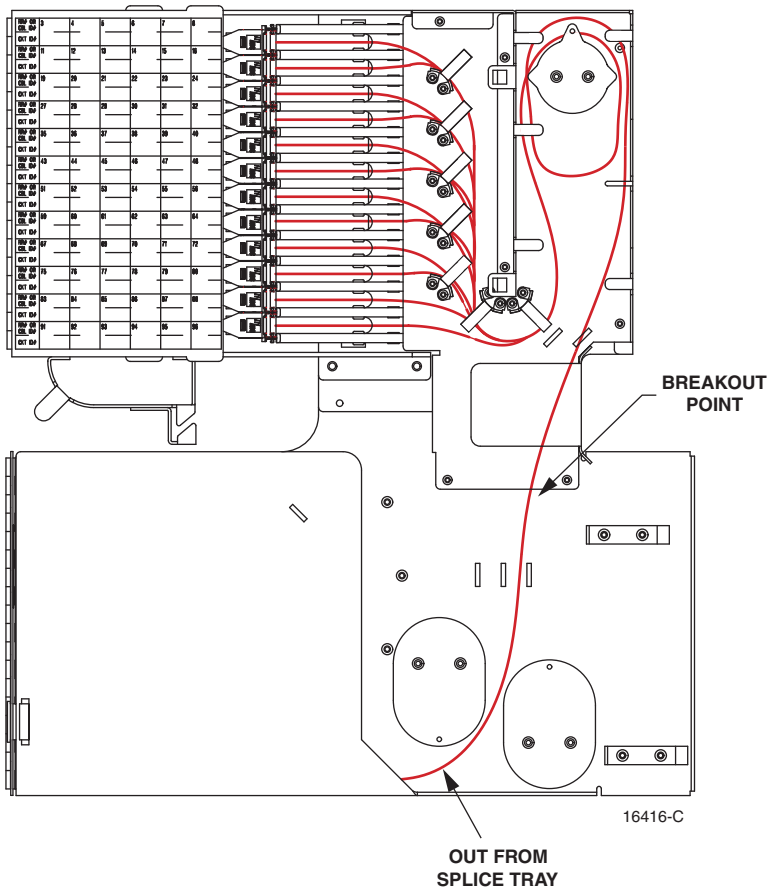

Figure 6. Correct Pigtail Routing on the CFB

4. In the Fiber Termination Block, pull out the sliding adapters one row at a time and connect the terminated end of the pigtails to the bulkhead adapters.

Note: Devise an orderly scheme for dividing the 12 connectors in the pigtail bundle with the number of adapters in the adapter packs (there may be 6, 8, or 12 adapters per pack).

5. Route the fibers around the edge protectors and spools as shown in Figure 6.
6. Remove the round splice tray from the splice tray compartment and set it beside the FCB.
7. Route the pigtails in the route shown through the splice tray compartment and out to the round splice tray.
8. Remove splice tray covers.
9. Wind up pigtails within round splice tray. Use a clockwise wind for left-oriented FCB and a counter-clockwise wind for right-oriented FCB. Do not trim pigtails at this time.
10. Replace splice tray cover and return round splice tray to FCB.

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6 MOUNTING THE FCB ON THE RACK

Use the following procedure to mount the Fiber Combination Block on a FMDF or Slim Rack:

1. Ensure that the block is upright as shown in Figure 7.
2. Align the guides on the top of the FCB with the top of the rack mounting bracket as shown in Figure 7.

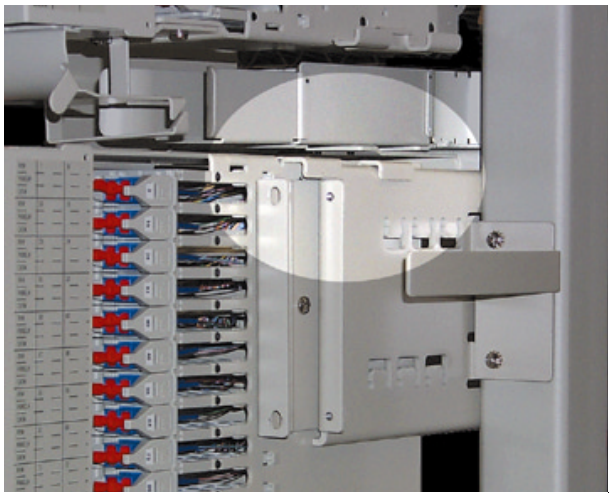

Figure 7. Aligning the Guides

3. Slide the FCB into position as shown in Figure 8.

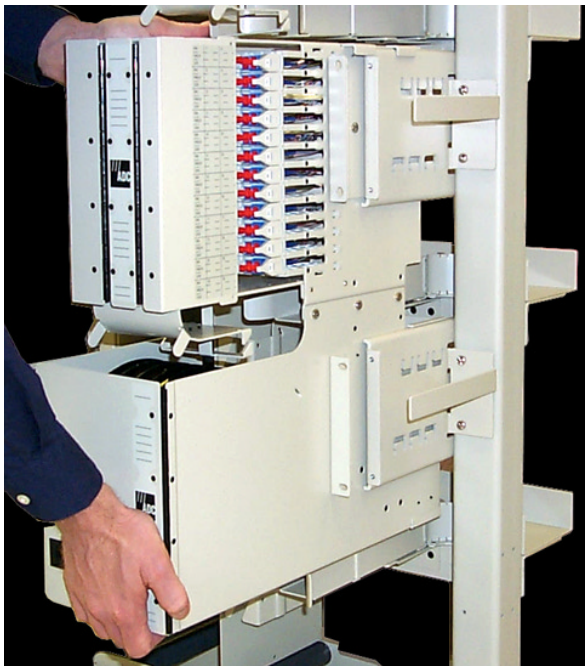

Figure 8. Sliding the FTB Into Position

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4. Secure the FCB to the frame using four #12 screws provided, as shown in Figure 9.

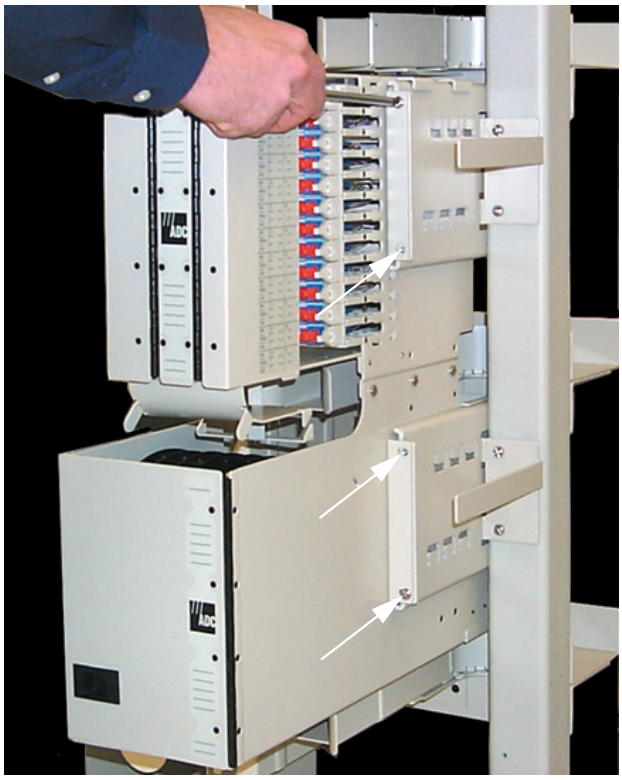

Figure 9. Securing the FCB on the Rack

7 INSTALLING CABLES

The cable being installed may be either Outside Plant (OSP) or Intrafacility Cable (IFC).

7.1 Breaking Out the Cable

Break out the cable corresponding to Figure 10 below.

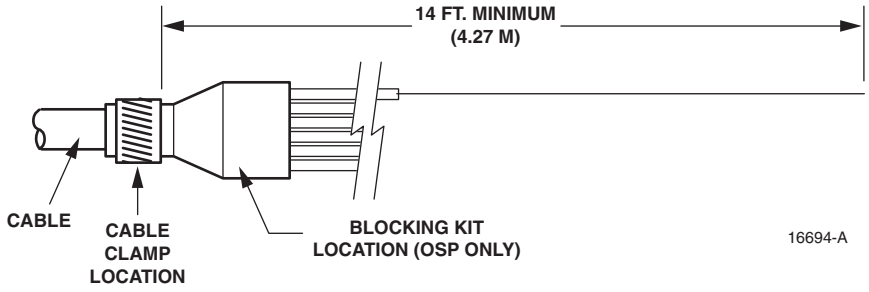

Figure 10. Cable Breakout

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7.2 Installing a Blocking Kit

If installing OSP cable, install a blocking kit prior to clamping the cable. The blocking kit must be ordered separately. Figure 11 shows an example. Follow the instructions in the kit.

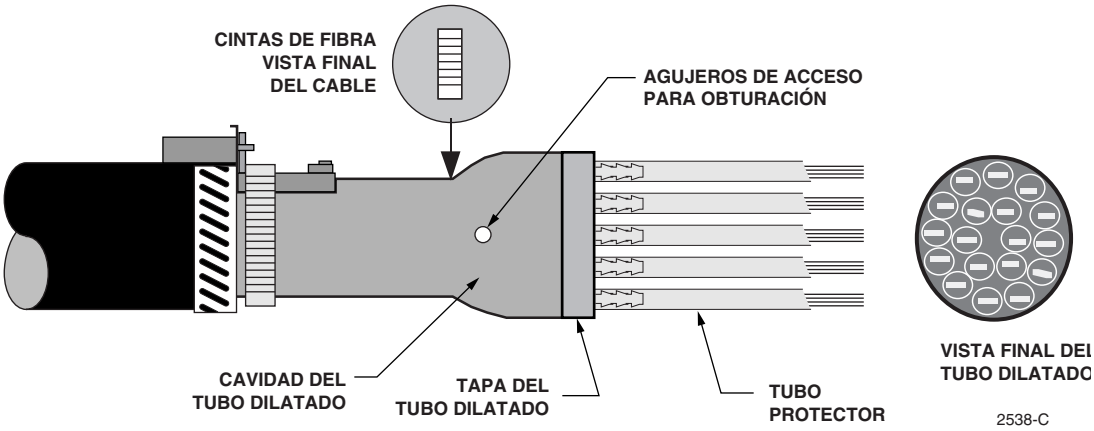

Figure 11. Blocking Kit Example

7.3 Installing a Cable Clamp

A cable clamp is provided with the FCB. Figure 12 provides an exploded view.

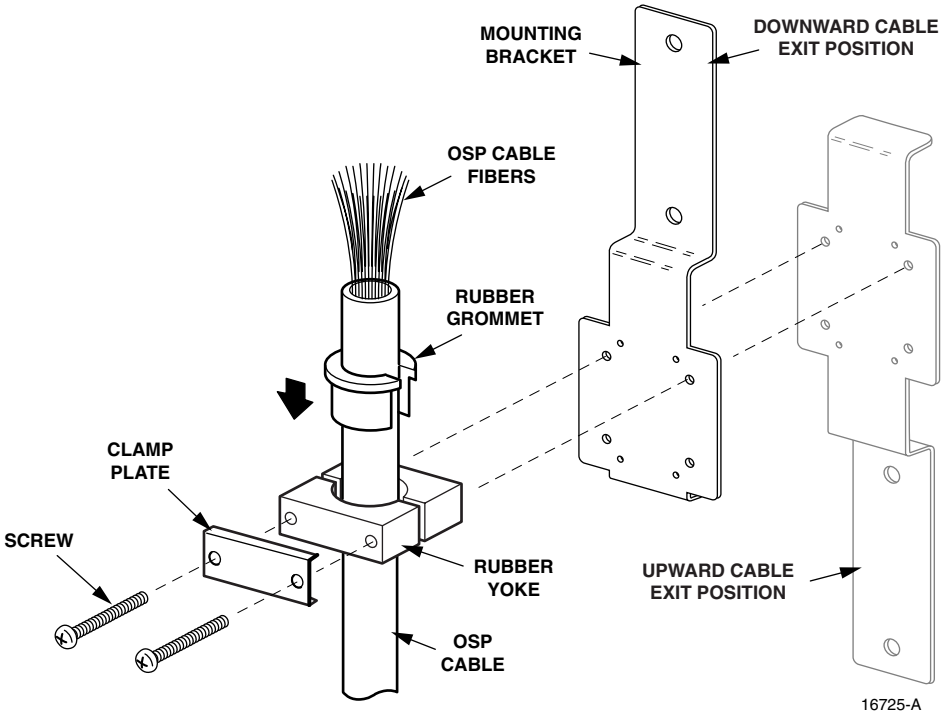

Figure 12. Cable Clamp Kit Exploded View

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1. Select a cable clamp position on the rack based on whether the cable will exit upward or downward from the FCB, as shown in Figure 13.

Note: If the FCB occupies the top position on the rack, install the clamp at the vertical cable guide located midway between the two vertical cable guides called out in Figure 13.

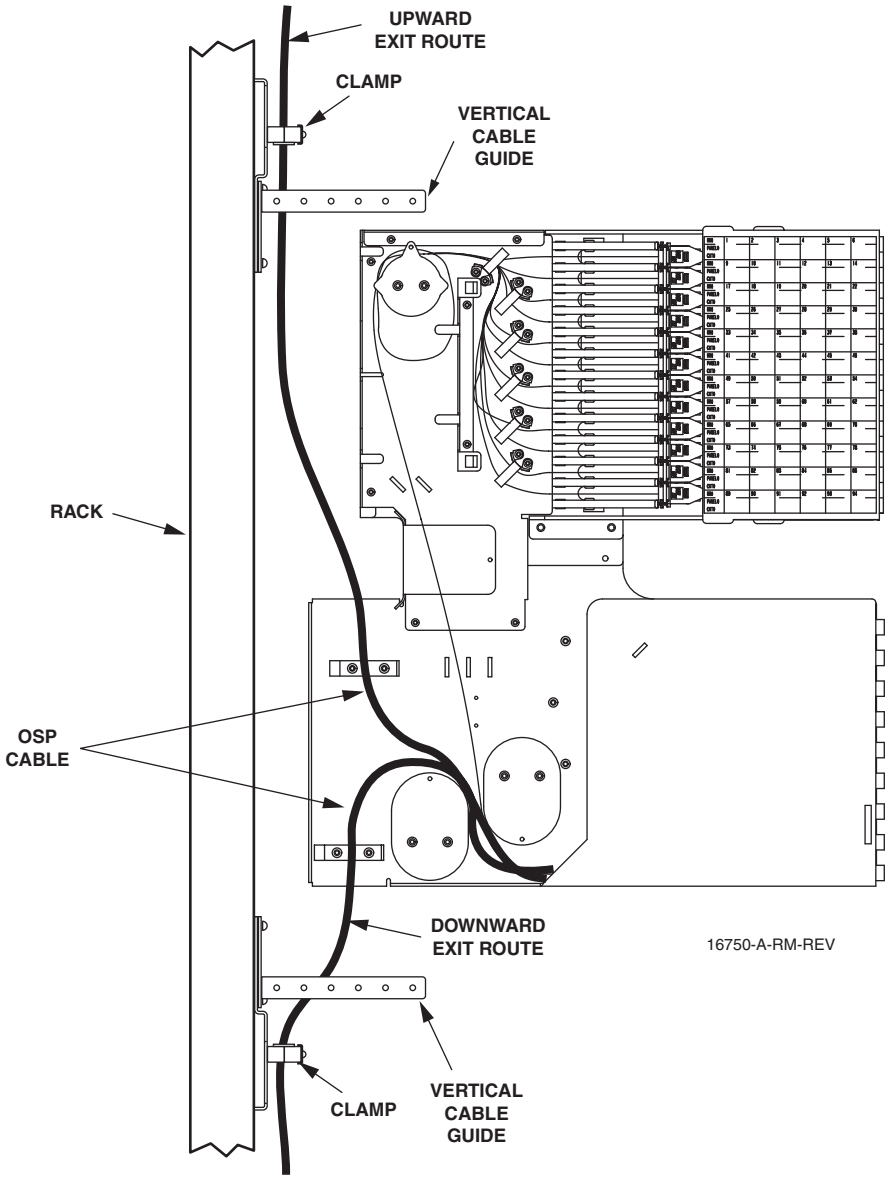

Figure 13. Selecting Cable Clamp Position on Rack

2. Remove the vertical cable guide at the location where you intend to install the cable clamp.
3. Install the cable clamp mounting bracket inside the vertical cable guide as shown in Figure 14.

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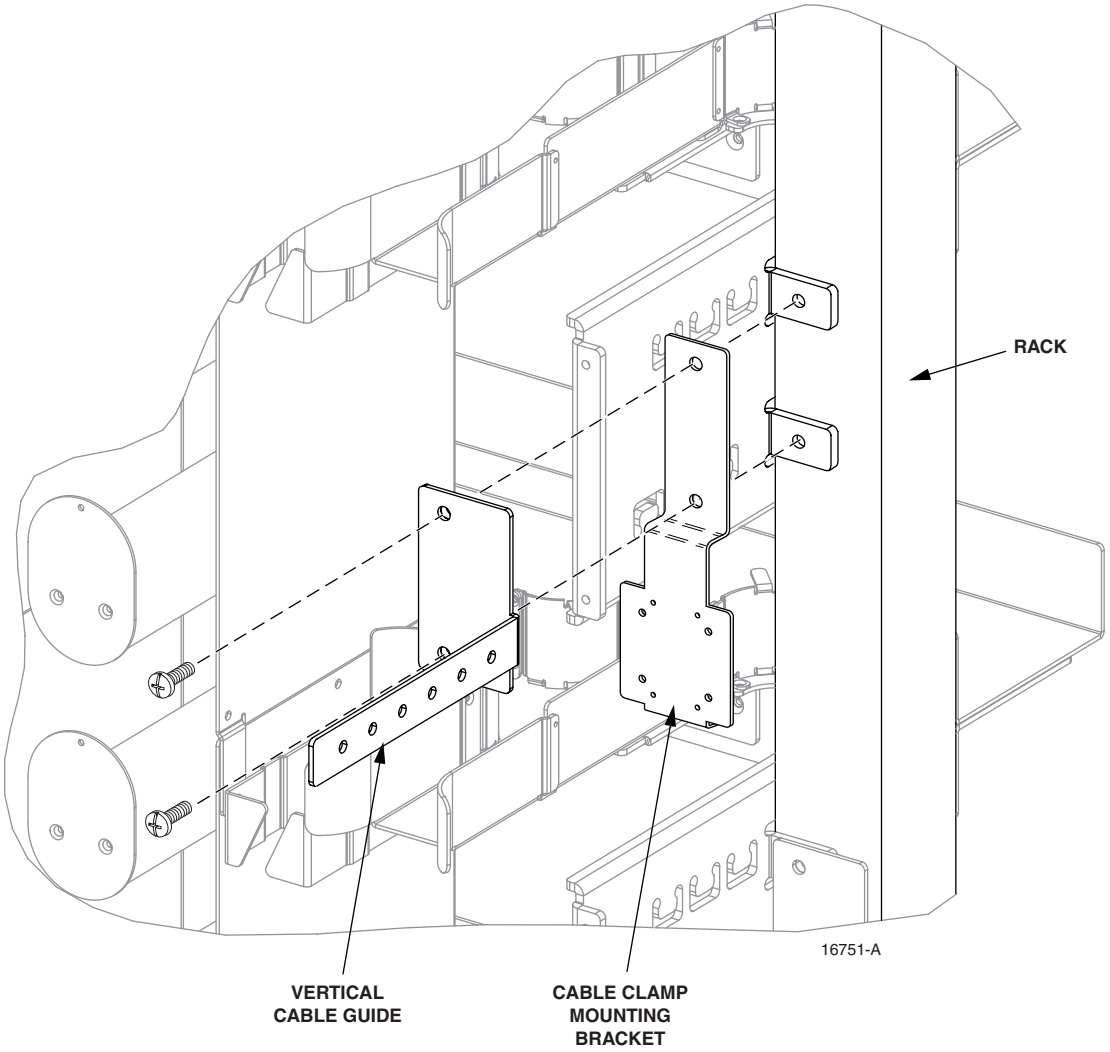

Figure 14. Installing the Cable Clamp Mounting Bracket

4. Stack the clamp plate and one rubber yoke on the two screws provided. Refer to the exploded view provided in Figure 12.
5. Install a rubber grommet on the cable. If the cable has been fitted with a blocking kit, the grommet should be placed just before the blocking kit and cable breakout (refer to Figure 10). The cable should fit snugly within the grommet.

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6. Position the cable and grommet within the first rubber yoke (already stacked on the screws); place another rubber yoke on the screws on the other side of the grommet; and fasten the screws to the mounting bracket. Refer to Figure 15.
7. If the cable being installed has a metallic strength member, ground the cable using an alligator connector or split bolt connector (provided in the kit) as shown in Figure 15.

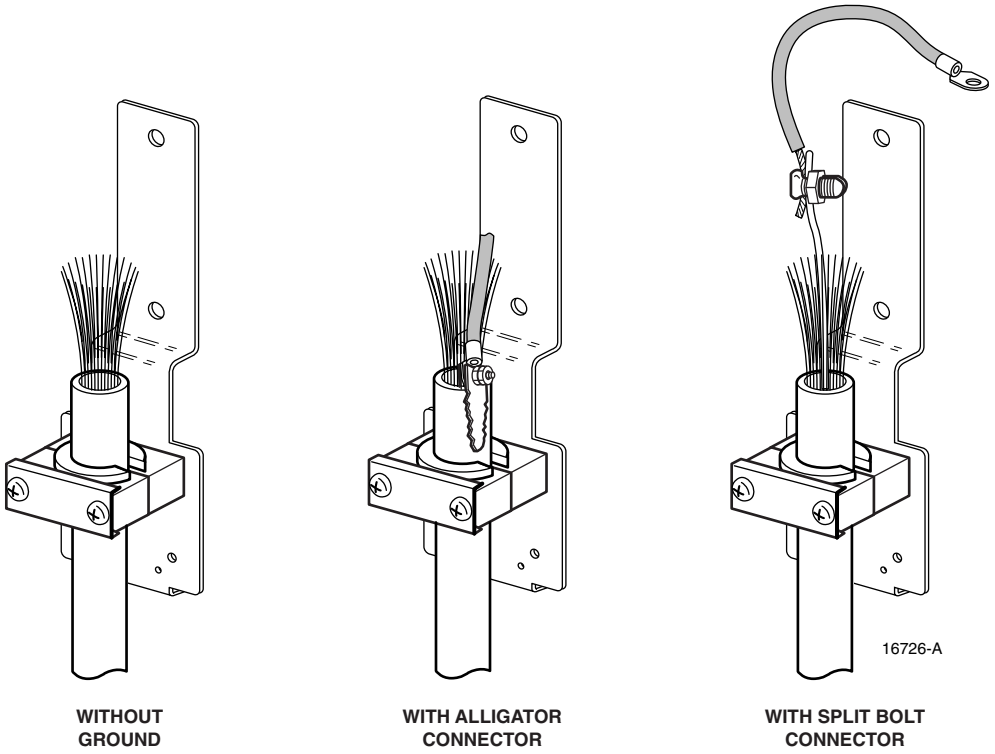

Figure 15. Cable Clamp Grounding Options (Downward Exit Shown)

8. Loop the cable up over the spools to prevent it from being damaged, and proceed to load the round splice trays.

Note: If you won't be loading the round splice trays at this time, route the fibers to the appropriate round splice tray and wrap them around the splice tray to protect them from damage. Wrap them in the same direction as the already installed pigtails.

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8 LOADING THE ROUND SPLICE TRAY

Different procedures are provided within this section for standard and 24-fiber heat-shrink splice configurations, and for left-oriented and right-oriented FCBs.

Note: The 24-fiber heat shrink configuration may be used in LX.5 applications only.

Select from the procedures based on the following guidelines:

1. Refer to Table 2 below to determine whether you are doing a standard or 24-fiber heat-shrink splice configuration.
2. Find the corresponding subsection in the following pages.
3. Break out the cable subunits and pigtails using the first procedure in that subsection.
4. Select either of the remaining subsections depending on whether you are loading a left-oriented or right-oriented FCB.

Table 2. Round Splice Tray Procedures

SPLICE CONFIGURATION	DESCRIPTION	PROCEDURES
Standard	Use when doing: 12 or fewer splices using heat shrink chip; three or fewer splices using ribbon mass fusion; 24 or fewer splices using bare fusion chip or swiss ant chip.	8.1.1, Breaking Out Cable Subunits and Pigtails 8.1.2, Left-Oriented FCBs (Clockwise Wind) 8.1.3, Right-Oriented FCBs (Counter-Clockwise Wind)
24-Fiber Heat Shrink (LX.5 Only)	Use for 24-fiber heat shrink splice chips only (LX.5).	8.2.1, Breaking Out Cable Subunits and Pigtails 8.2.2, Left-Oriented FCBs (Clockwise Wind) 8.2.3, Right-Oriented FCBs (Counter-Clockwise Wind)

8.1 Standard Splice Configuration

If doing a standard splice, first break out the cable subunits and pigtails as described in 8.1.1, Breaking Out Cable Subunits and Pigtails below, then perform a clockwise or counter-clockwise load as described in either 8.1.2, Left-Oriented FCBs (Clockwise Wind) or 8.1.3, Right-Oriented FCBs (Counter-Clockwise Wind) on the following pages.

8.1.1 Breaking Out Cable Subunits and Pigtails

To be wound correctly into the round splice tray, the cable subunits and pigtails must be the same length; therefore, they should be measured and broken out side by side.

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To break out the cable subunits and pigtails, perform the following steps:

1. Unwind the round splice tray to a flat surface in front of the rack.
2. Pull out the cable subunits and pigtails in a straight line directly in front of the rack as shown in Figure 16 below.
3. Break out the cable subunits and pigtails corresponding to Table 3 below, measuring from the point where the cable subunits and pigtails exit from the splice chassis.

Note: The cut length for the cable subunits and pigtails must be the same for them to be wound into the splice tray correctly.

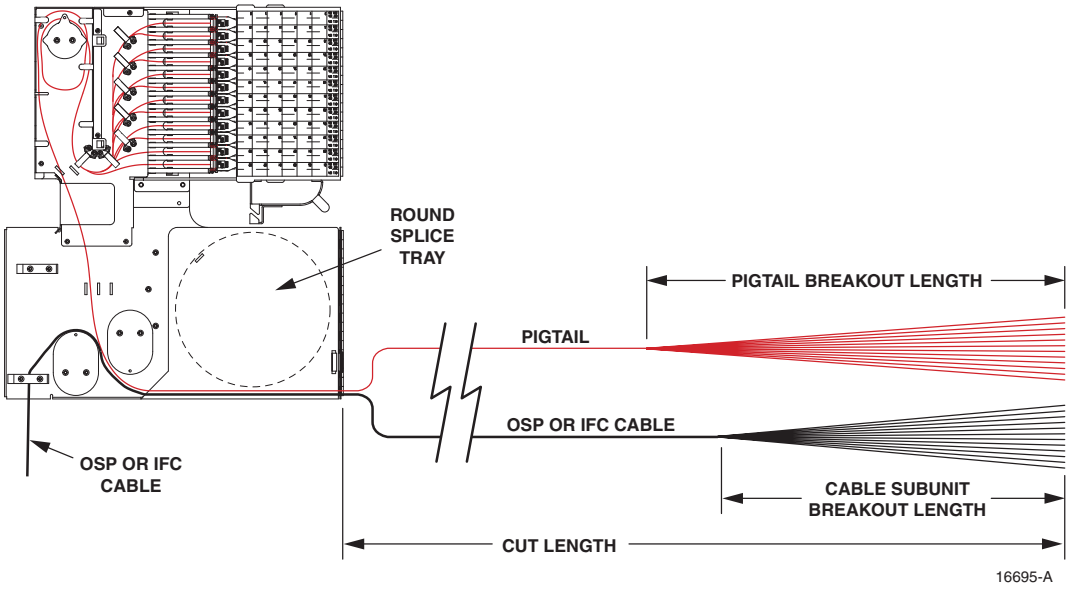

Figure 16. Breakout Lengths for Cables and Pigtails

Table 3. Breakout Lengths for Standard Splice

	CUT LENGTH*	BREAKOUT LENGTH	
Pigtail	68 in. (minimum) to 146 in. (maximum)	48 in.	+1.0 in/–0.0 in.
	172.7 cm (minimum) to 370.8 cm (maximum)	121.9 cm	+2.5 cm/–0.0 cm
Cable Subunit	Same length as above	37 in.	+1.0 in./–0.0 in.
		94 cm	+2.5 cm/–0.0 cm

Note: It is recommended to use the maximum cut length of 146 in. (370.8 cm) to achieve maximum distance from FCB for splicing.

Note: The cut length for the cable subunits and pigtails must be the same for them to be wound into the splice tray correctly.

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8.1.2 Left-Oriented FCBs (Clockwise Wind)

Use this procedure for an FCB that is mounted on the left side of the rack. In this case, you wind the pigtail in a clockwise direction.

1. Start with the fiber breakout positioned at the transition point from top to bottom, as shown in Figure 17. Route and tie down the pigtail as shown in Figure 17.

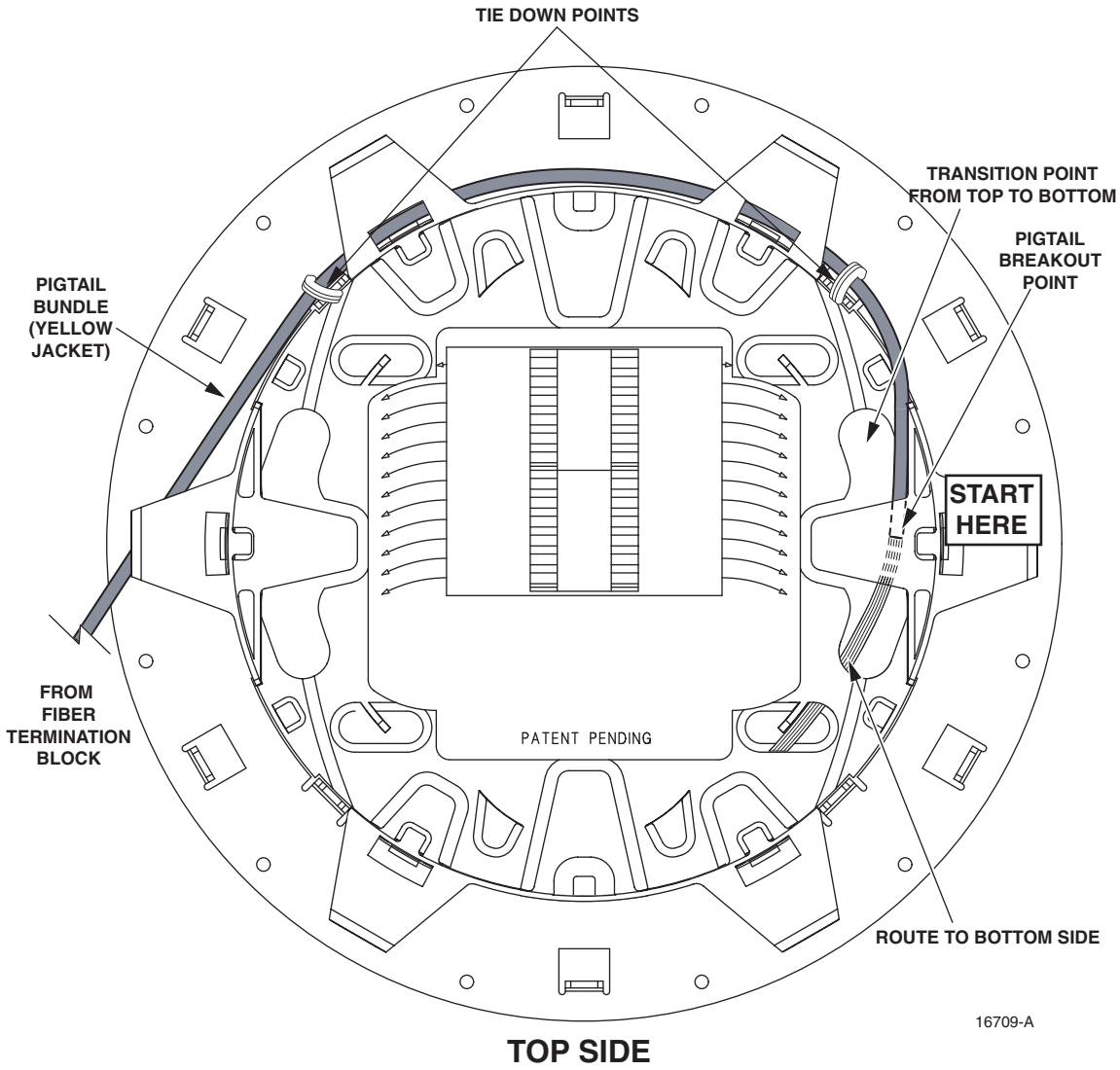

Figure 17. Starting Pigtails

2. Flip the tray over and route the pigtail around the spools and back to the top side of the splice tray as shown in Figure 18.

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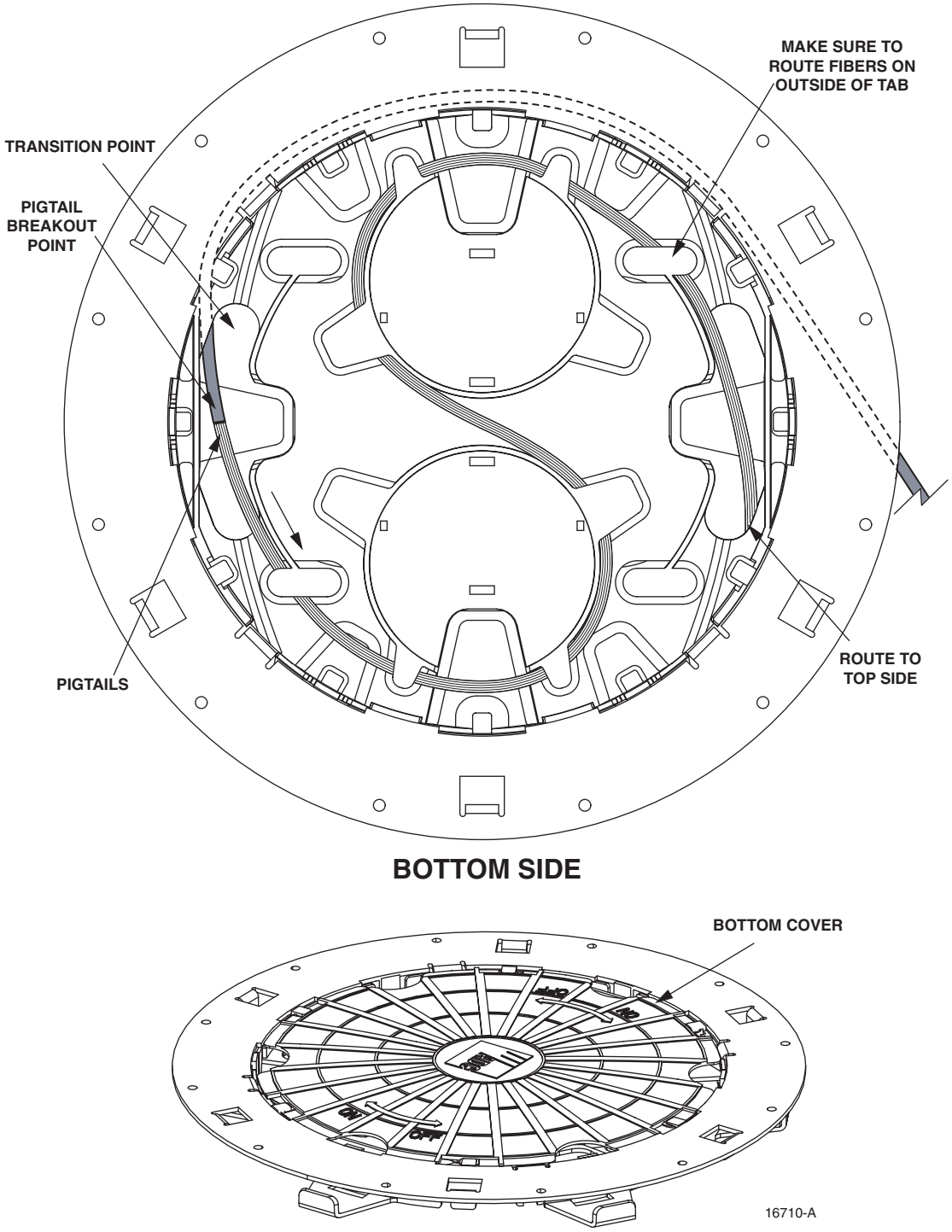

Figure 18. Routing Pigtails on Bottom of Tray

3. Flip the tray over to the top side and route the pigtail to the splice chip area as shown in Figure 19.

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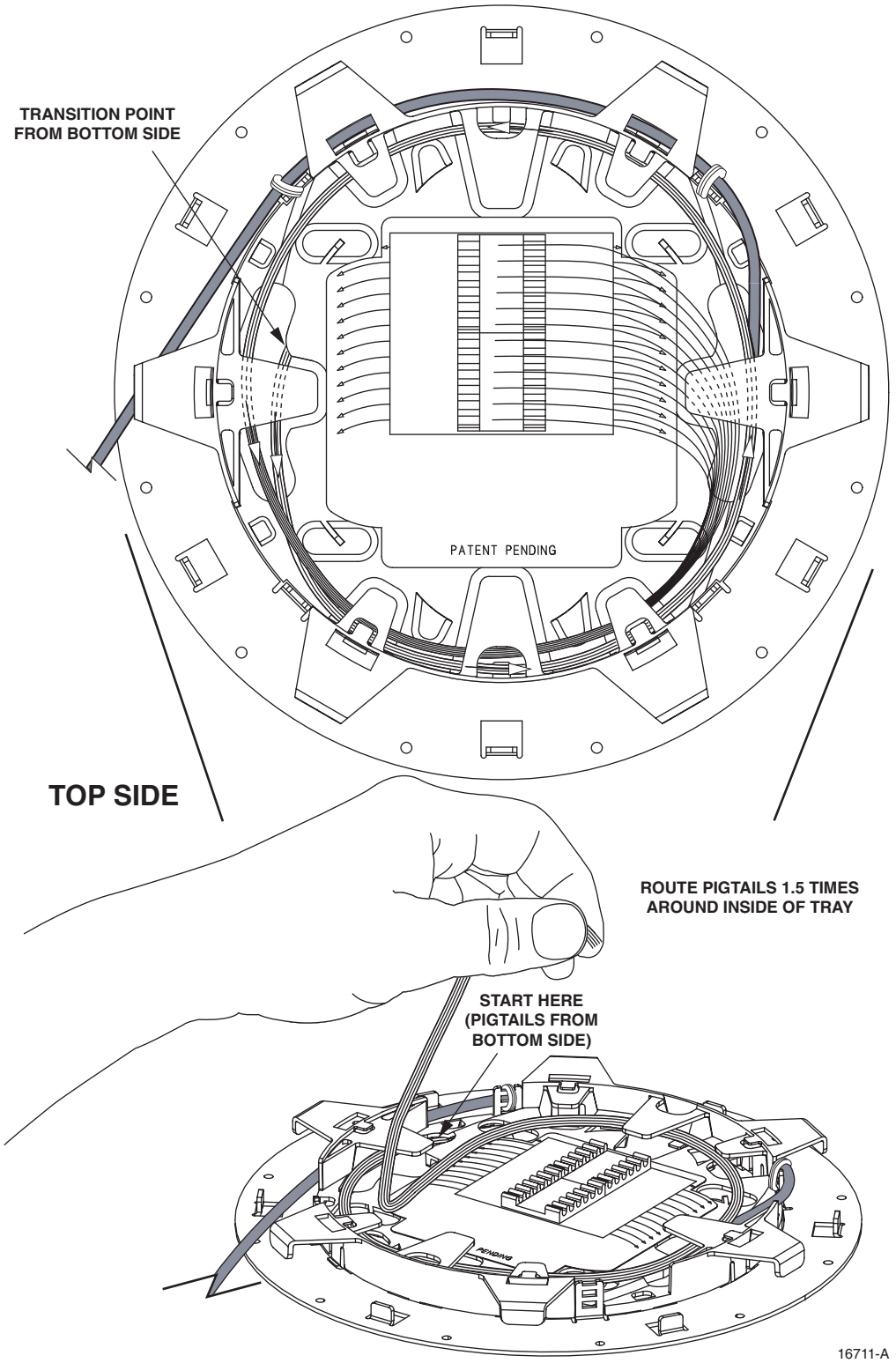

Figure 19. Completing Pigtail Winding

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4. Route in the IFC or OSP cable subunits as shown in Figure 20.

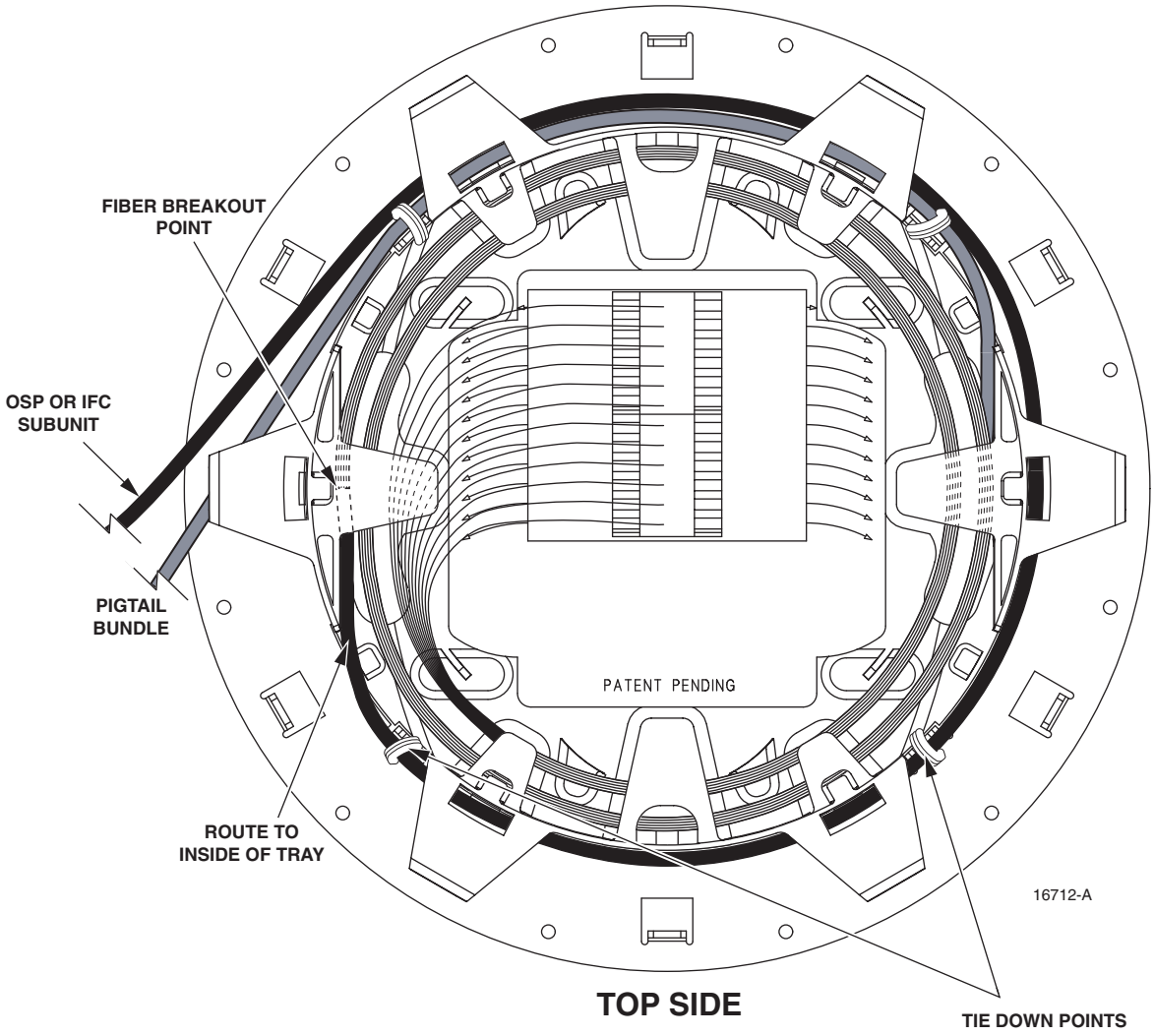

Figure 20. Correct Routing for OSP or IFC Subunit

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8.1.3 Right-Oriented FCBs (Counter-Clockwise Wind)

Use this procedure for an FCB that is mounted on the right side of the rack. In this case, you wind up the pigtail in a counter-clockwise direction.

1. Start with the fiber breakout positioned at the transition point from top to bottom, as shown in Figure 21. Route and tie down the pigtail as shown in Figure 21.

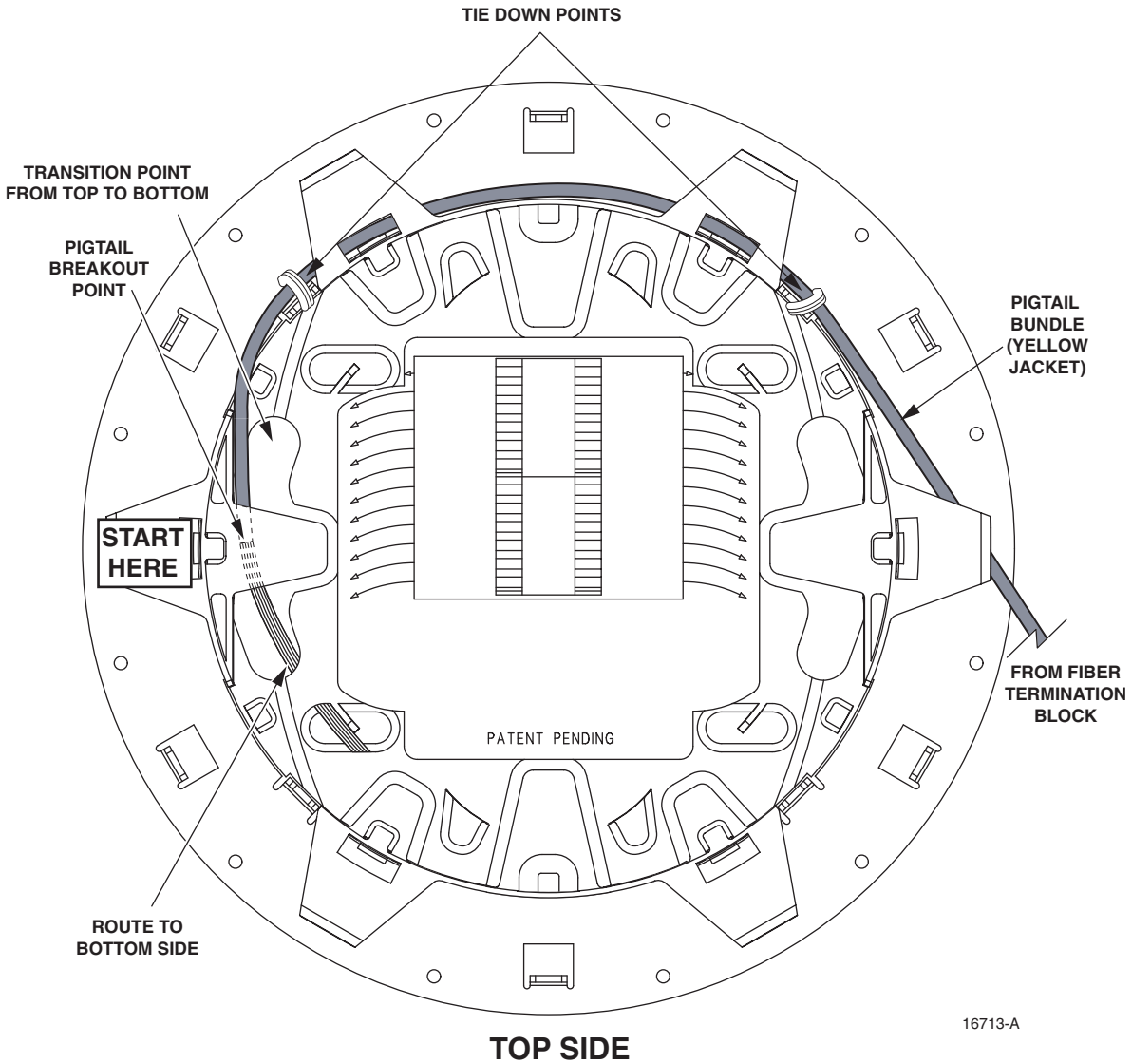

Figure 21. Starting Pigtails

2. Flip the tray over and route the pigtail around the spools and back to the top side of the splice tray as shown in Figure 22.

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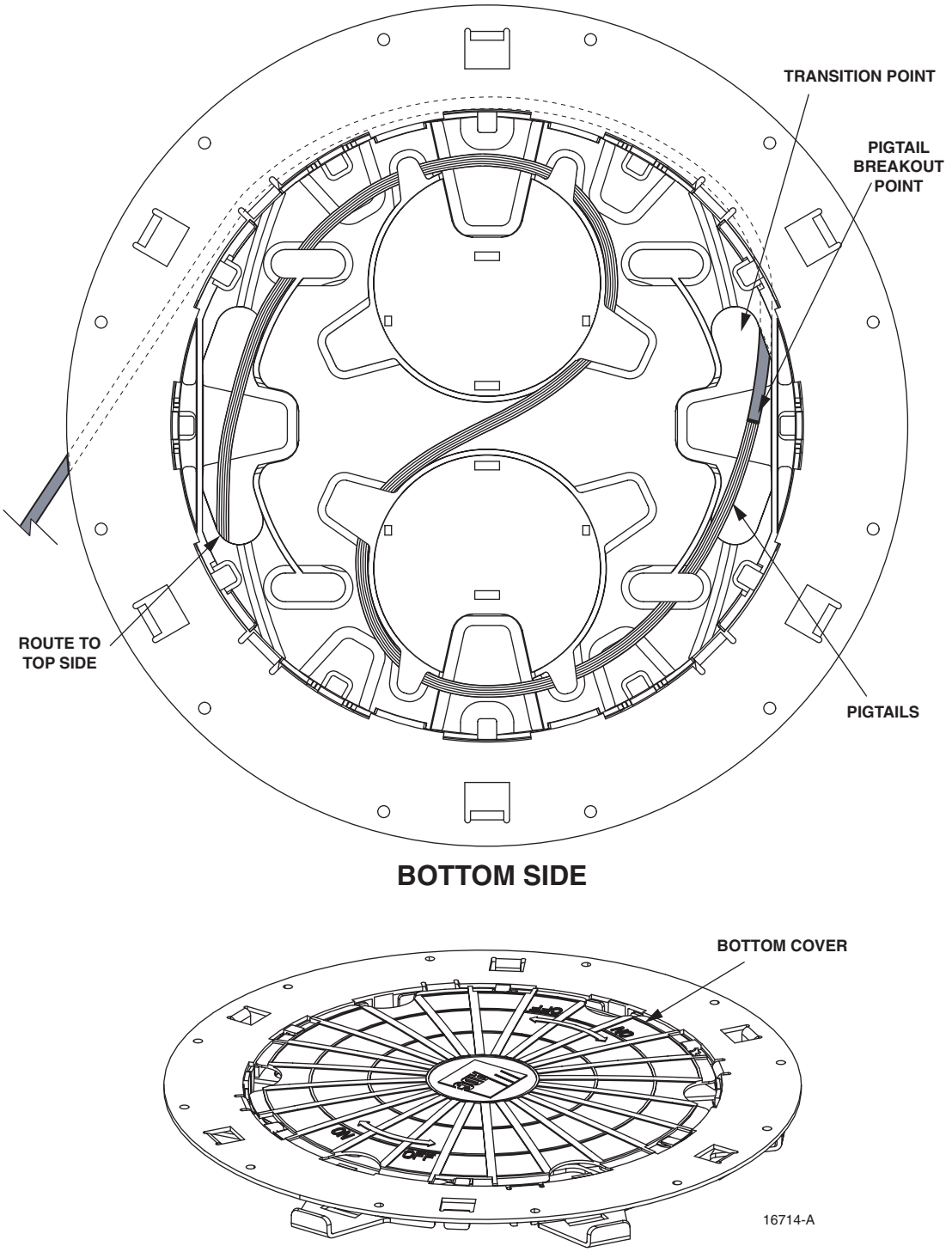

Figure 22. Routing Pigtails on Bottom of Tray

3. Flip the tray over to the top side and route the pigtail to the splice tray area as shown in Figure 23.

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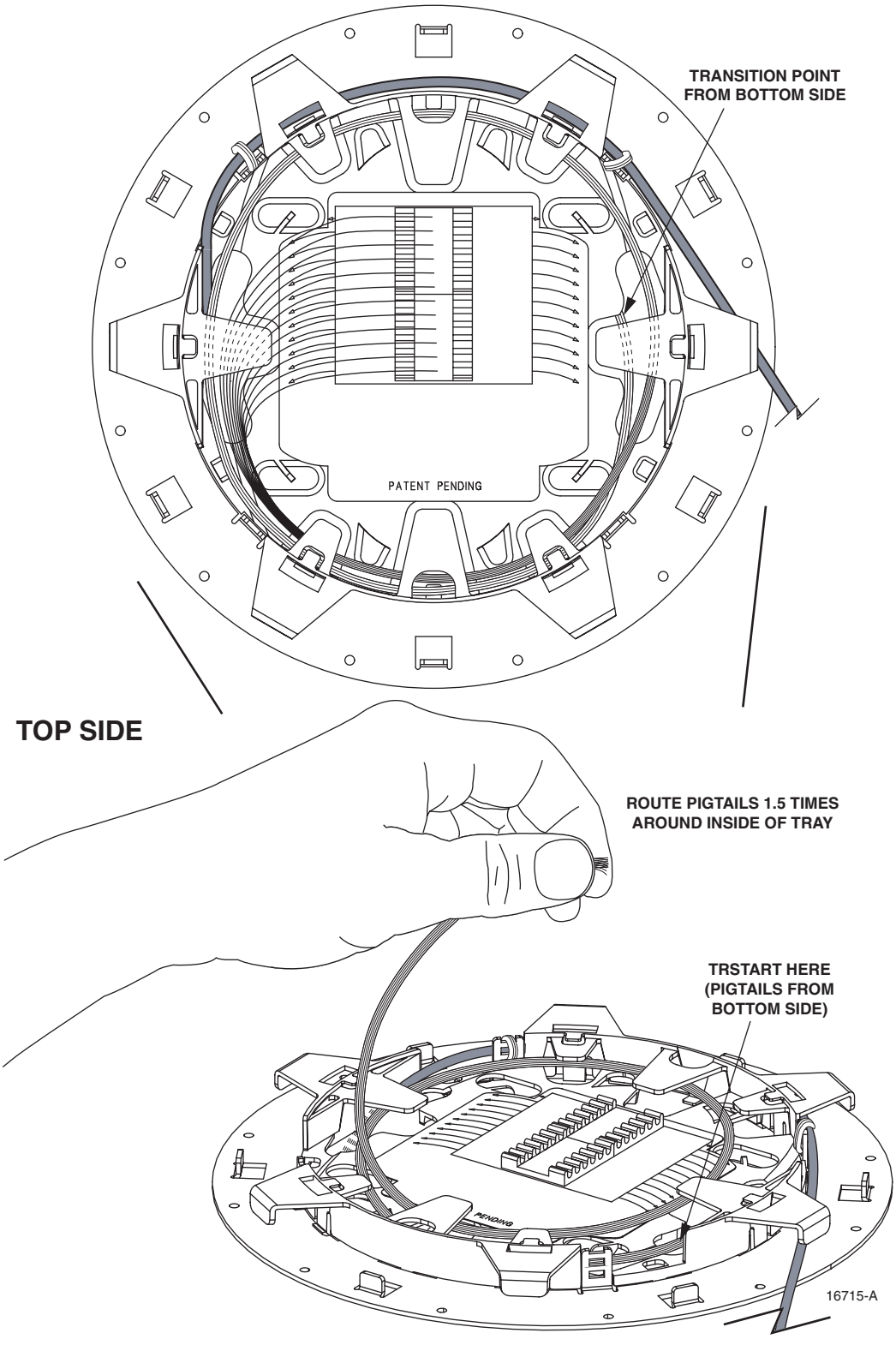

Figure 23. Completing Pigtail Winding

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4. Route in the IFC or OSP cable subunits as shown in Figure 24.

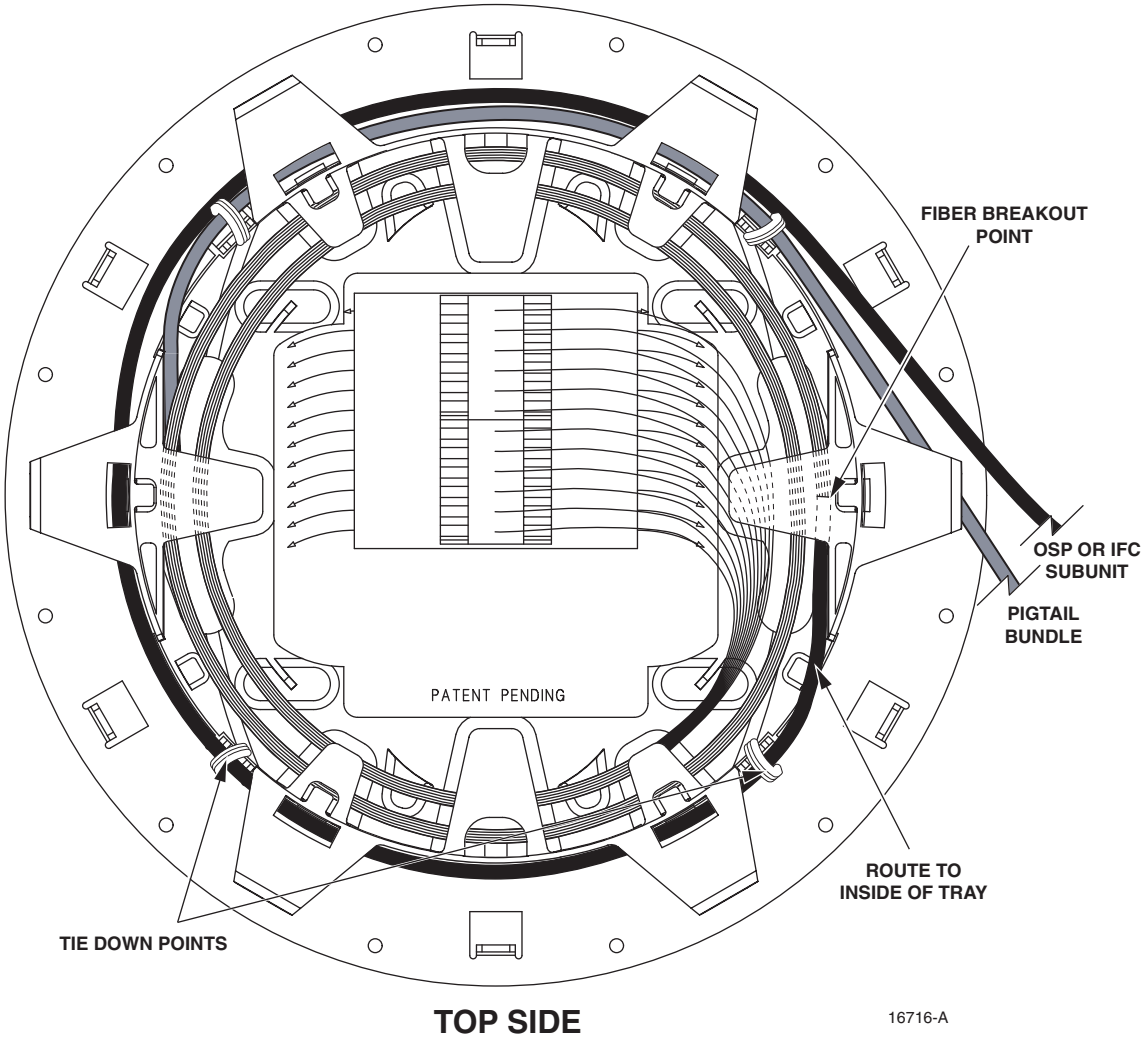

Figure 24. Correct Routing for OSP or IFC Subunit

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8.2 24-Fiber Heat-Shrink Configuration (144 FCB With LX.5 Only)

If doing a 24-fiber heat-shrink splice (LX.5 only), first break out the cable subunits and pigtails as described in 8.2.1, Breaking Out Cable Subunits and Pigtails below, then perform a clockwise or a counter-clockwise load as described in either 8.2.2, Left-Oriented FCBs (Clockwise Wind) or 8.2.3, Right-Oriented FCBs (Counter-Clockwise Wind) on the following pages.

8.2.1 Breaking Out Cable Subunits and Pigtails

To be wound correctly into the round splice tray, the cable subunits and pigtails must be the same length; therefore, they should be measured and broken out side by side. To break out the cable subunits and pigtails, perform the following steps:

1. Unwind the round splice tray to a flat surface in front of the rack.
2. Pull out the cable subunits and pigtails in a straight line directly in front of the rack as shown in Figure 25.
3. Break out the fibers and pigtails corresponding to Table 4 below the figure.

Note: Typically, two pigtail bundles and two cable subunits are routed to each round splice tray in this configuration, with the first and second of each having different breakout dimensions, as indicated in Table 4. If possible, use the maximum cut length of 96 inches (243.8 cm) for the first cable subunit. Shorter lengths may be necessary for larger cable counts and larger cable diameters.

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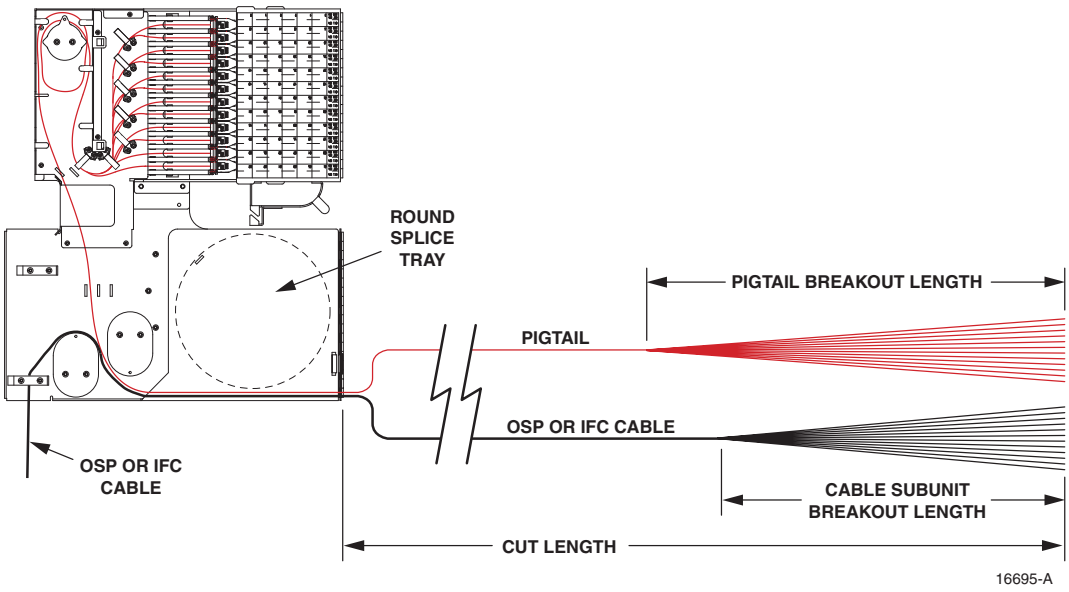

Figure 25. Breakout Parameters for Cables and Pigtails

Table 4. Breakout Lengths for 24-Fiber Heat-Shrink Splice (LX.5 Only)

	CUT LENGTH	BREAKOUT LENGTH	
First Pigtail*	68 in. (minimum) to 96 in. (maximum)	48 in.	+1.0 in./–0.0 in.
	172.7 cm (minimum) to 243.8 cm (maximum)	121.9 cm	+2.5 cm/–0.0 cm
Second Pigtail*	8 in. (20.3 cm) shorter than first pigtail	40 in.	+1.0 in./–0.0 in.
		102 cm	+2.5 cm/–0.0 cm
First Cable Subunit	Same length as first pigtail	37 in.	+1.0 in./–0.0 in.
		94 cm	+2.5 cm/–0.0 cm
Second Cable Subunit	Same length as second pigtail	29 in.	+1.0 in./–0.0 in.
		73.7 cm	+2.5 cm./–0.0 cm

*Two pigtails per round splice tray

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8.2.2 Left-Oriented FCBs (Clockwise Wind)

Use this procedure for an FCB that is mounted on the left side of the rack. In this case, you wind up the pigtail in a clockwise direction.

1. Start with the fiber breakout positioned at the transition point from top to bottom, as shown in Figure 26. Route and tie down both the pigtails as shown in Figure 26.

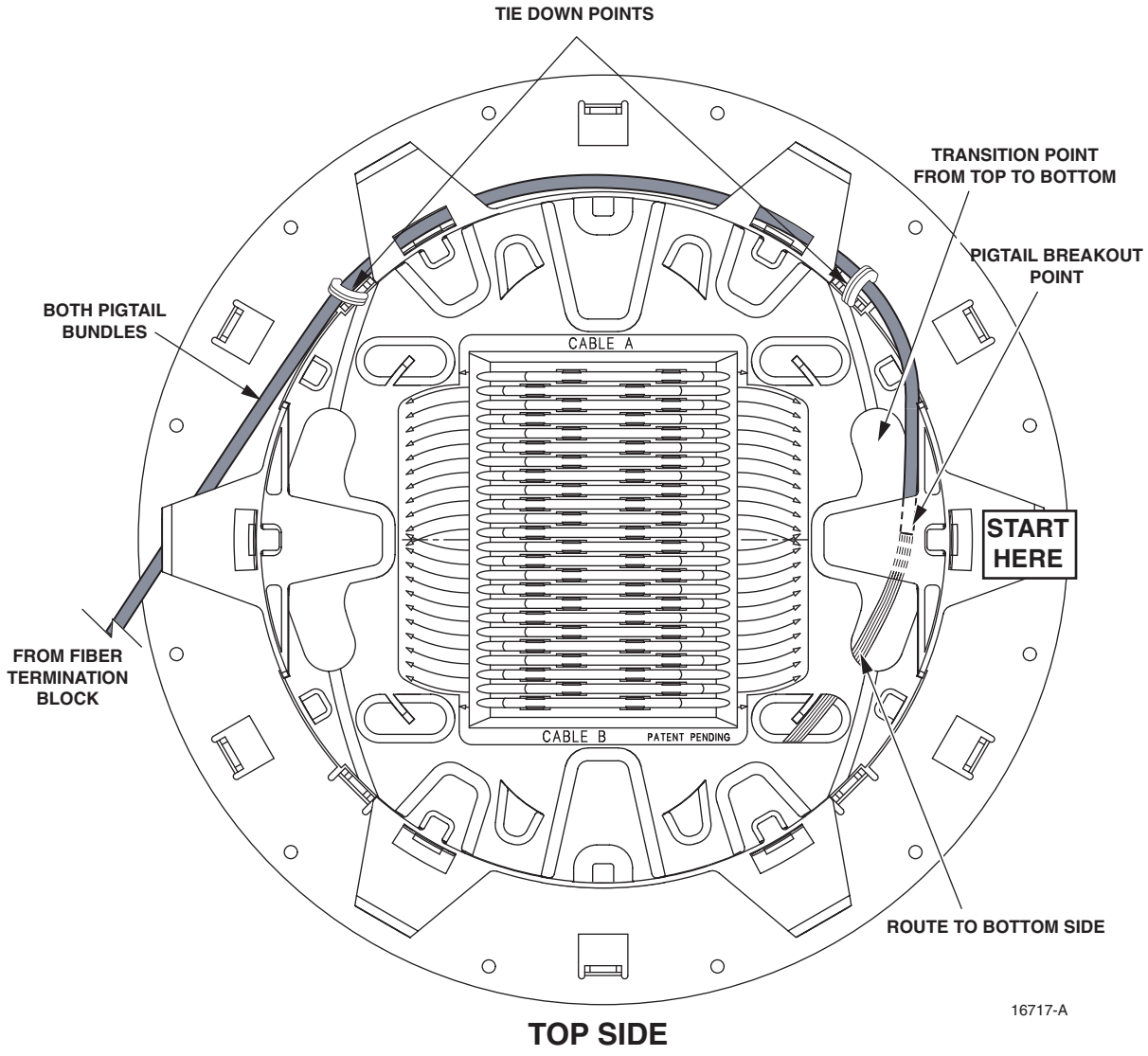

Figure 26. Starting Pigtails

2. Flip the tray over and route the pigtails around the spools and back to the top side of the splice tray as shown in Figure 27.

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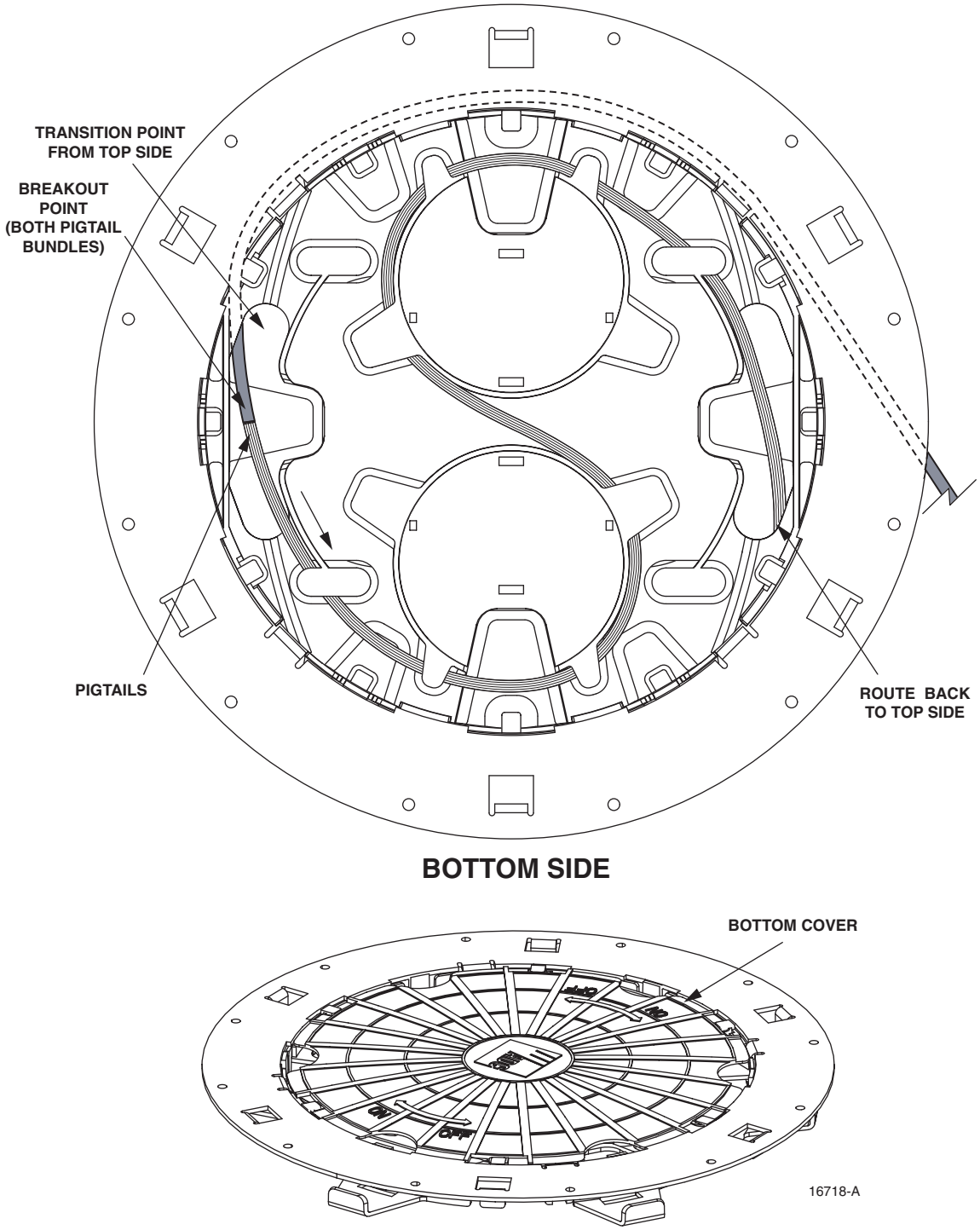

Figure 27. Routing Pigtails on Bottom of Tray

3. Flip the tray over to the top side and route the pigtails and cable subunits to the splice tray area as shown in Figure 28 and Figure 29 below.

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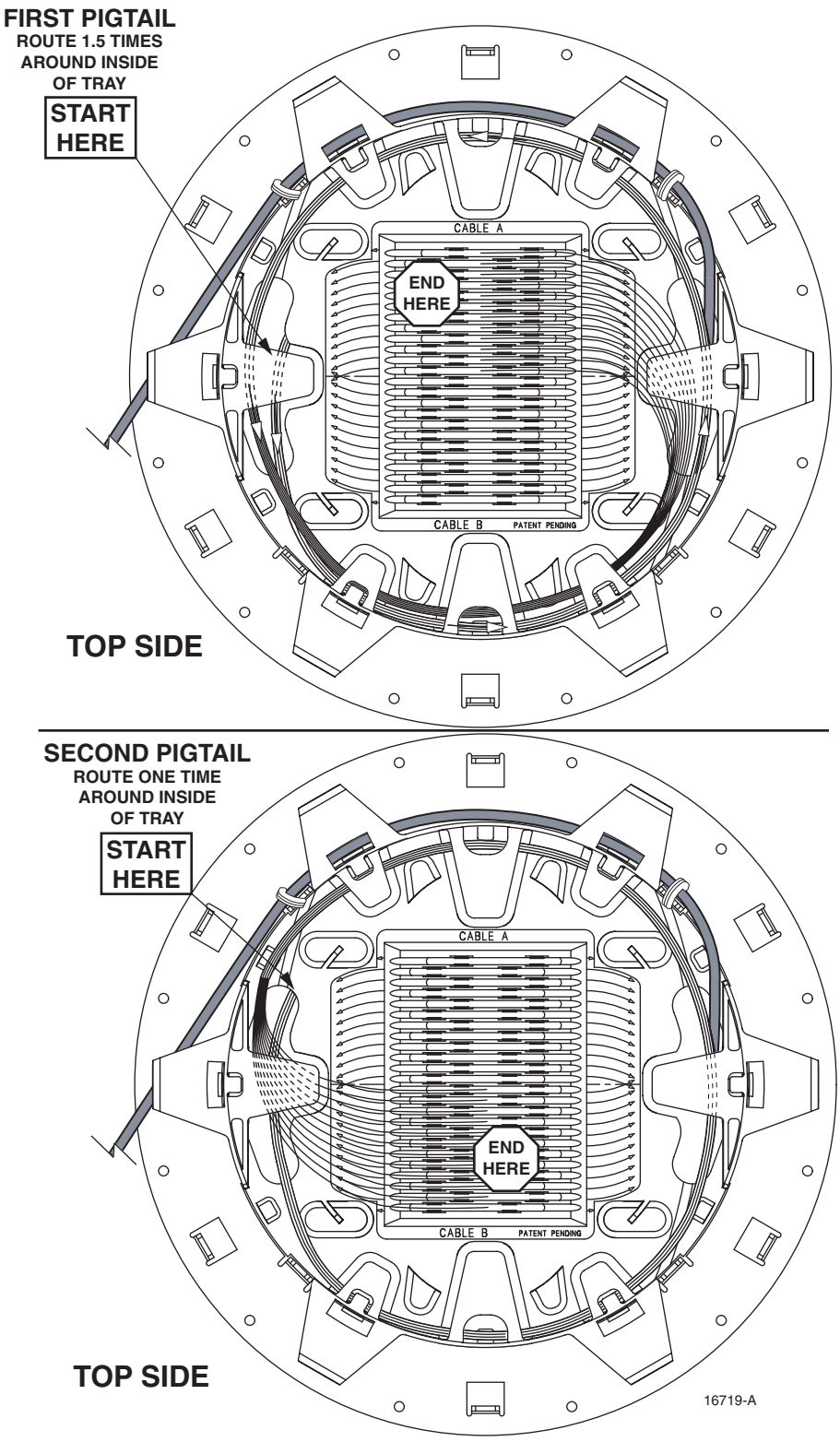

Figure 28. Completing Pigtail Winding

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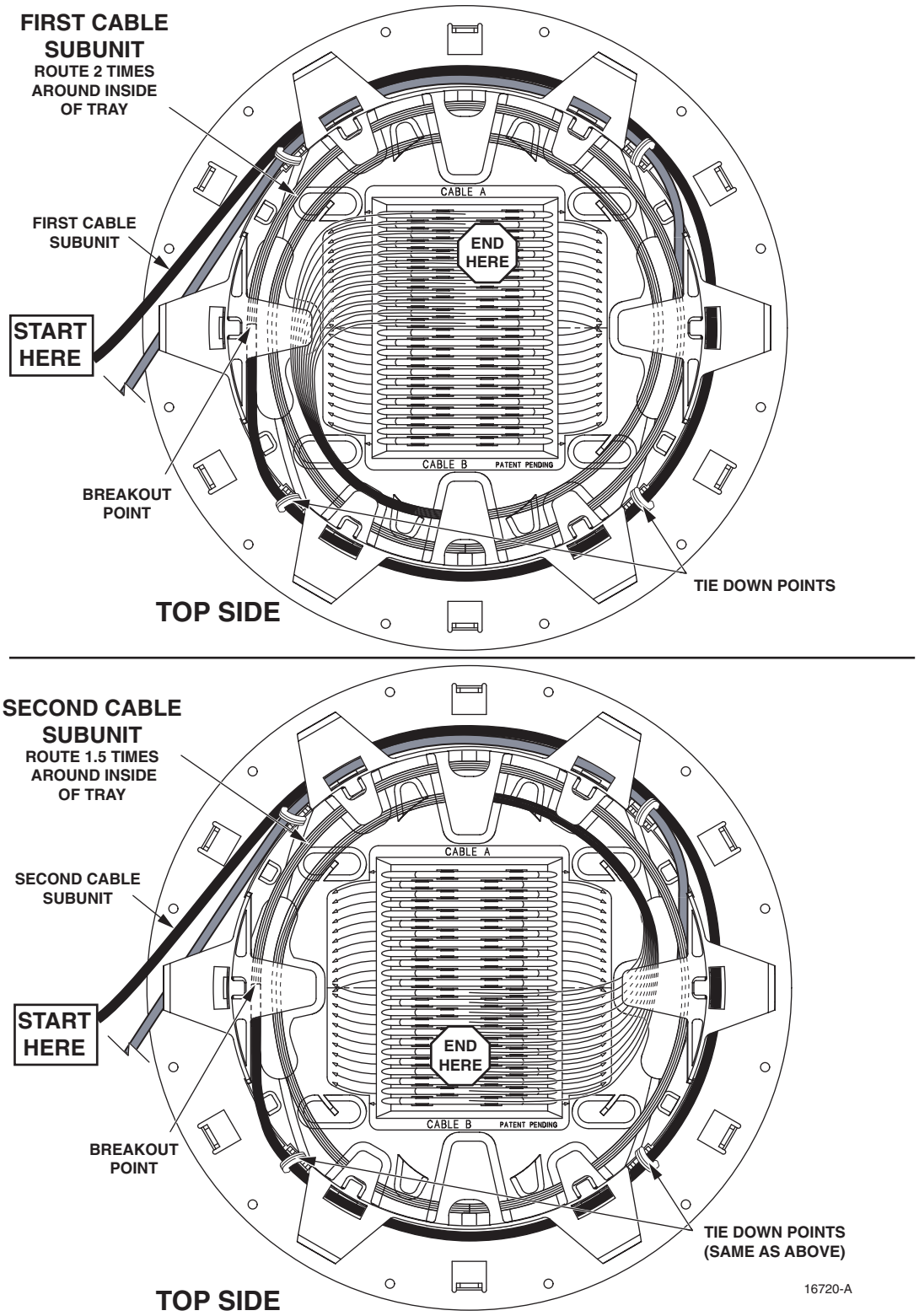

Figure 29. Correct Routing for OSP or IFC Subunits

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8.2.3 Right-Oriented FCBs (Counter-Clockwise Wind)

Use this procedure for an FCB that is mounted on the right side of the rack. In this case, you wind up the pigtail in a counter-clockwise direction.

1. Start with the fiber breakout positioned at the transition point from top to bottom, as shown in. Route and tie down both the pigtails as shown in Figure 30.

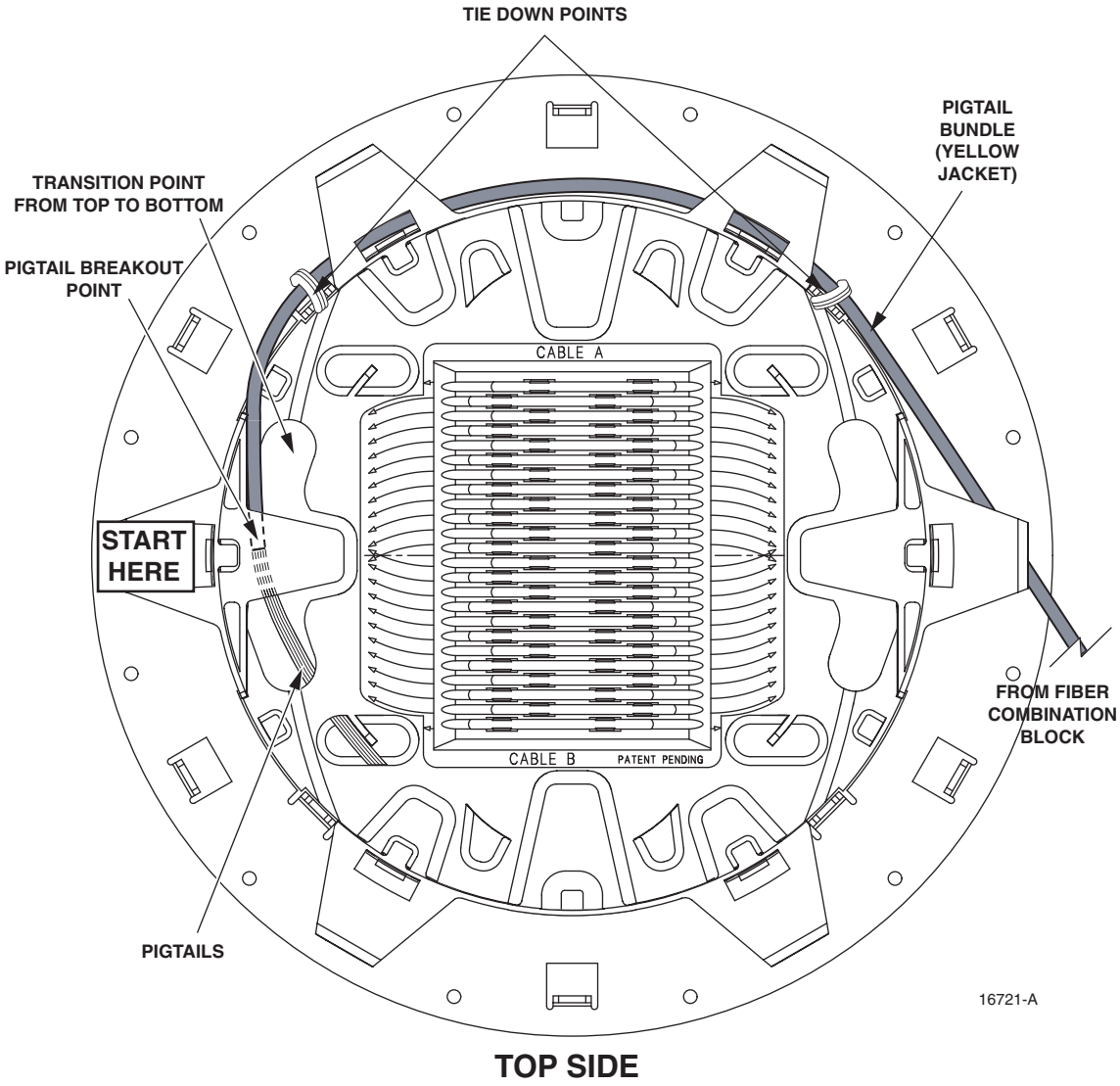

Figure 30. Starting Pigtails

2. Flip the tray over and route the pigtails around the spools and back to the top side of the splice tray as shown in Figure 31.

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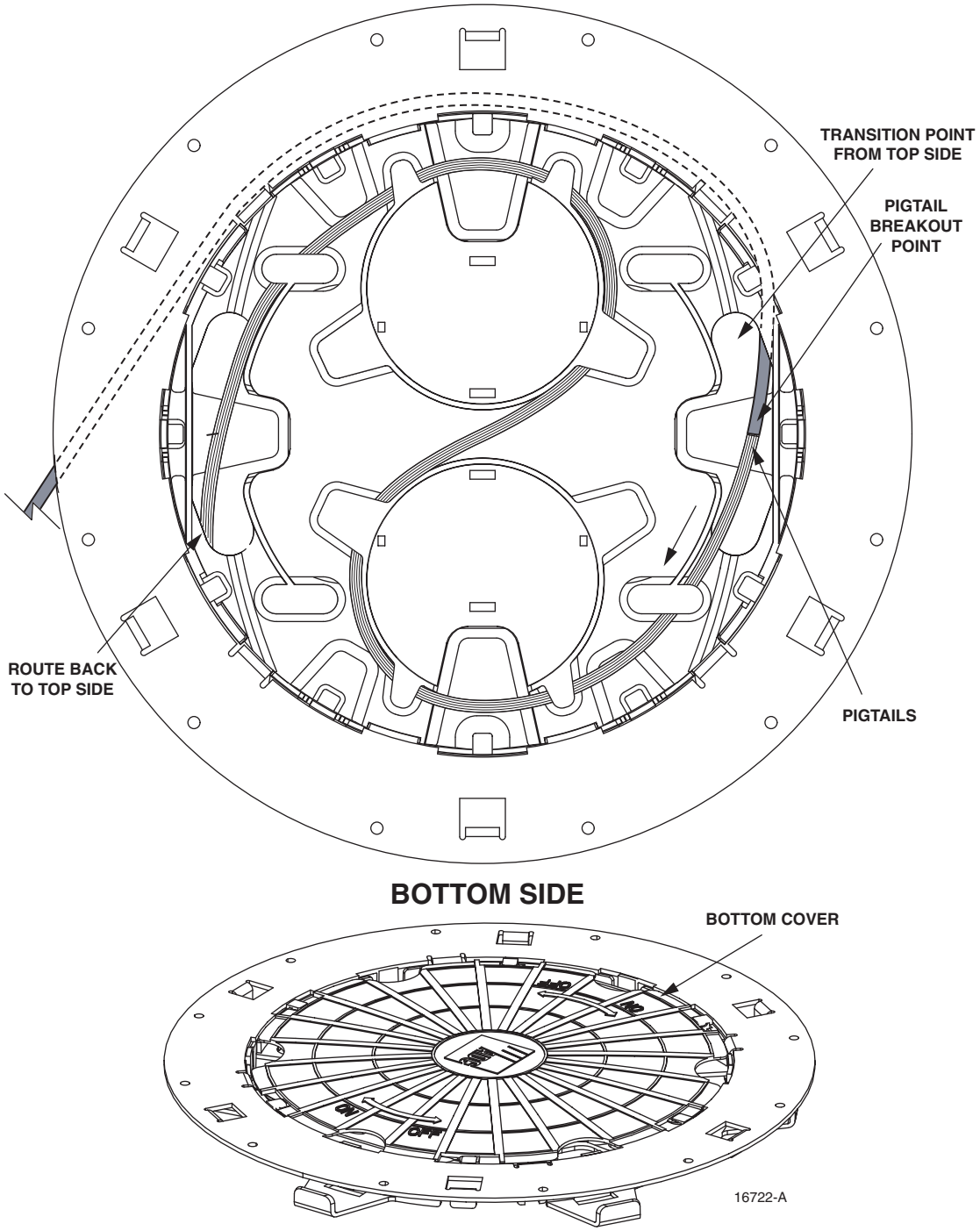

Figure 31. Routing Pigtails on Bottom of Tray

3. Flip the tray over to the top side and route the pigtails and cable subunits to the splice tray area as shown in Figure 32 and Figure 33 below.

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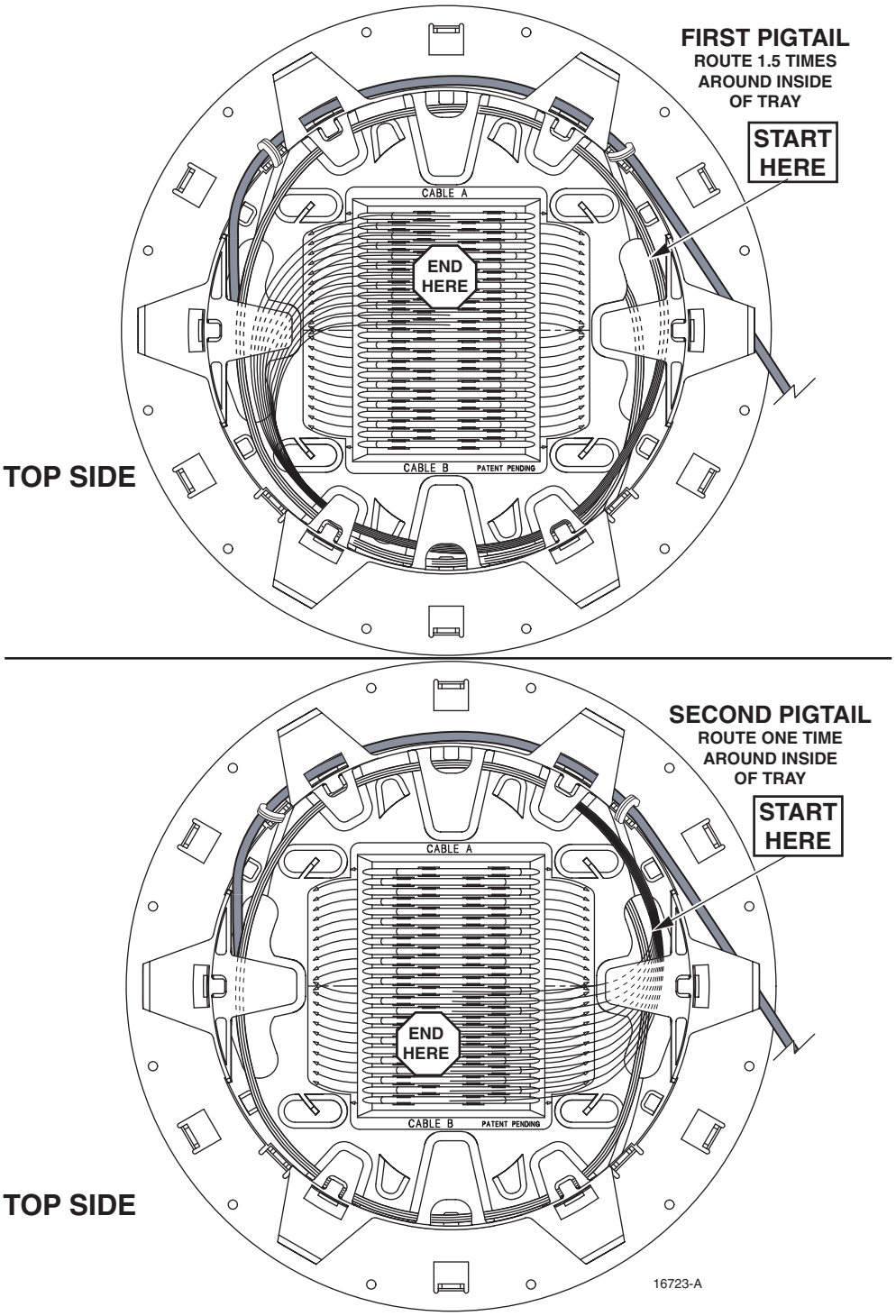

Figure 32. Completing Pigtail Winding

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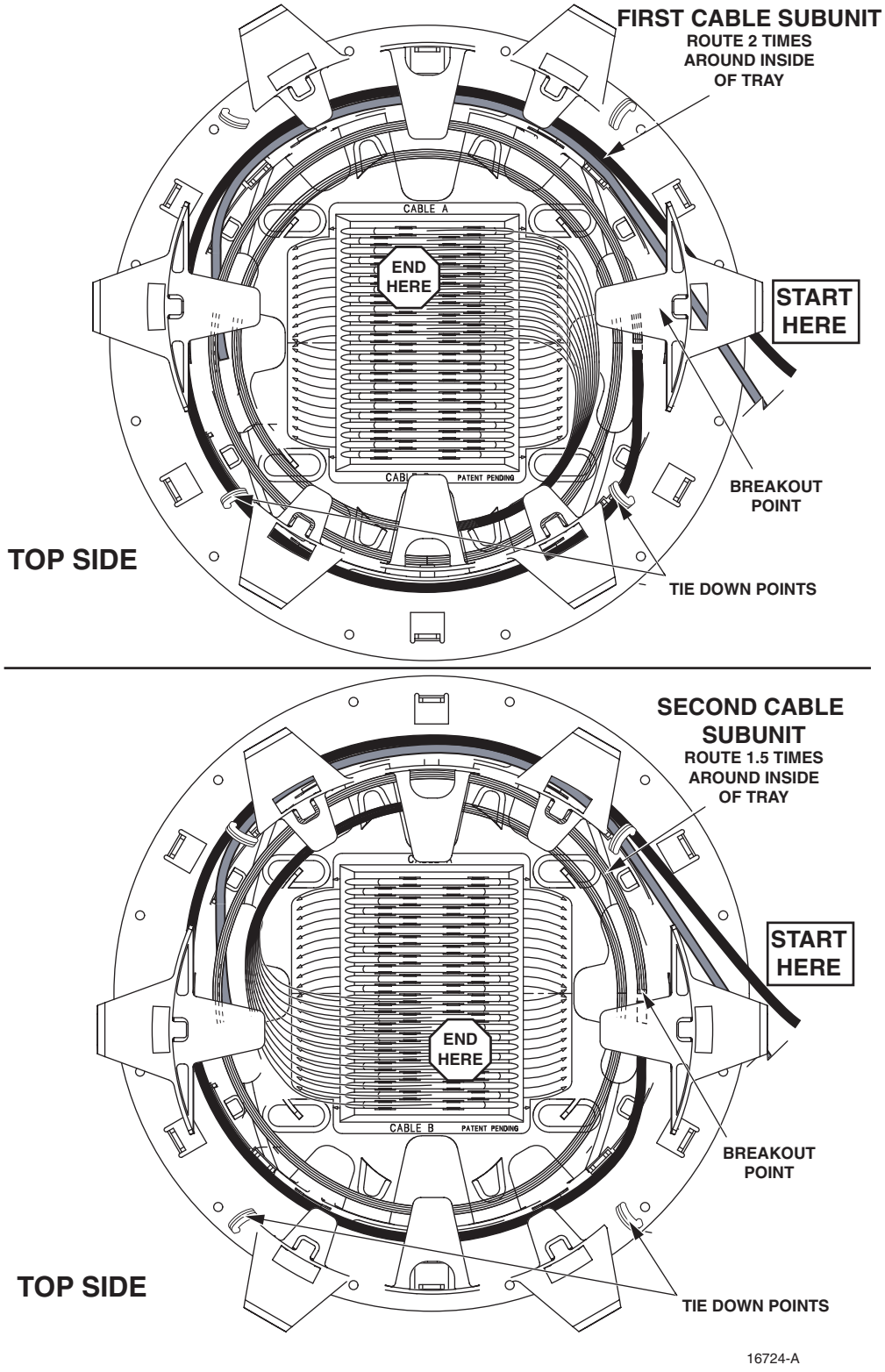

Figure 33. Correct Routing for OSP or IFC Subunits

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9 SPLICING

After installing the cable subunits and pigtails in the round splice tray, you can proceed to perform splices following local procedure. If splices will not be performed at once, return the round splice trays to the splice chassis.

10 INSTALLING PATCH CORDS

Patch cords are installed on the front of the Fiber Termination Block to complete optic circuits or for patching or testing. Figure 34 provides a side view of correctly routed patch cords. Figure 35 gives an oblique view. Install patch cords using the following procedure:

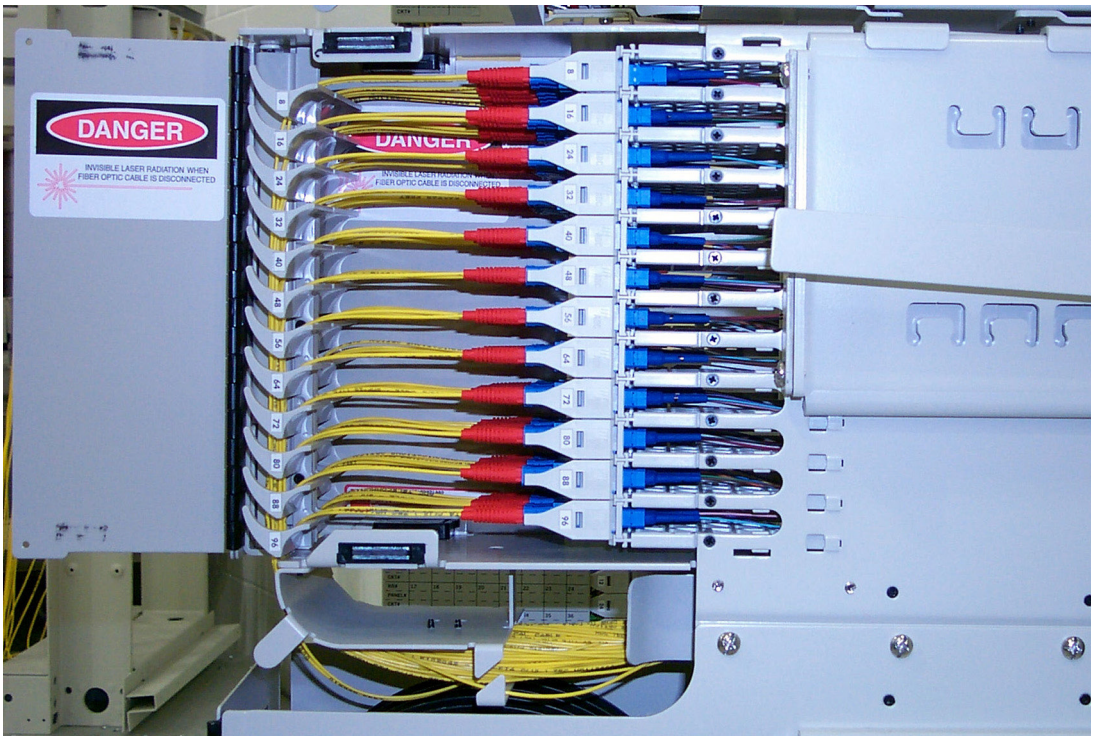

Figure 34. Correctly Routed Patch Cords (Side View)

1. Stand in front of the FCB and open the door to the Fiber Termination Block.
2. Identify the adapter pack at which you want to terminate patch cords and slide out the adapter pack toward you.

⚠ **Danger:** *Never look directly into an uncovered adapter for an active optic circuit. Laser light can cause serious damage to your eyes.*

3. Remove the dust covers from the adapter and clean the adapters per local guidelines.
4. Terminate the patch cord connectors at the appropriate adapters.

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5. Route the patch cords forward from the adapters and over the front edge protectors. Be careful not to kink or sharply bend the patch cords.
6. Route the patch cords down into the NGF "Z" trough and through the trough to the back of the FMDF or Slim Rack. Refer to Figure 34 and Figure 35.
7. Route the patch cords up or down through the rack vertical cable guides to the assigned termination point.

Note: For a thorough description of patch cord routing on the rack, refer to the patch cord routing procedures listed under "Related Publications" in the front matter of this manual.

8. Record the use of each patch cord using the designation label on the side of the FTB.

Figure 35. Correctly Routed Patch Cords (Oblique View)

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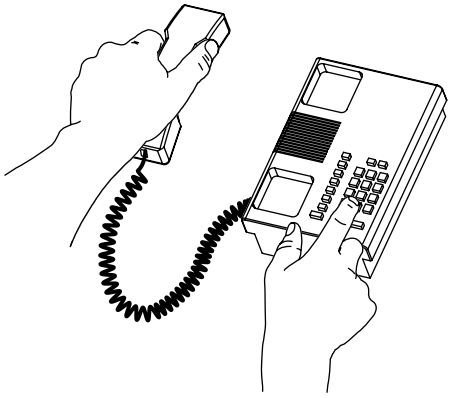

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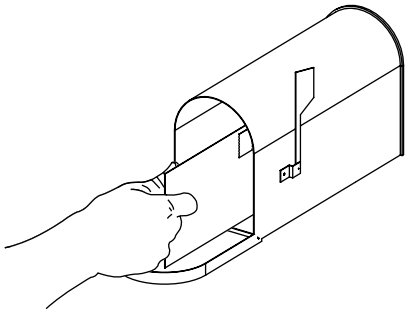
ADC TELECOMMUNICATIONS (S'PORE) PTE. LTD.
100 BEACH ROAD, #18-01, SHAW TOWERS.
SINGAPORE 189702.

ADC EUROPEAN CUSTOMER SERVICE, INC
BELGICASTRAAT 2,
1930 ZAVENTEM, BELGIUM



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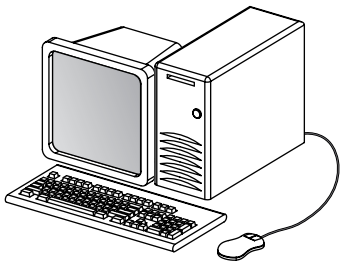

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